Indirect and Cumulative Impacts Analyses Technical Addendum

OAK HILL PARKWAY

U.S. Highway 290 (US 290) / State Highway (SH)
71 West from State Loop 1 (Mopac) to Ranch-to-Market (RM) 1826 and
SH 71 to Silvermine Drive
Travis County, Texas
CSJ # 0113-08-060 and 0700-03-077

December 2018

Texas Department of Transportation

The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried-out by TxDOT pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated December 16, 2014, and executed by FHWA and TxDOT.

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INDIRECT IMPACTS ANALYSIS

1. Introduction

The Texas Department of Transportation (TxDOT) and the Central Texas Regional Mobility Authority (CTRMA) are considering mobility improvements to U.S. Highway (US) 290 / State Highway (SH) 71 West through Oak Hill (the Oak Hill Parkway). The project corridor extends along US 290 from State Loop 1 (Loop 1 or Mopac) to Ranch-to-Market Road (RM) 1826 for a distance of approximately 6.15 miles with a transition to the west. The project also includes the interchange on SH 71 from US 290 to Silvermine Drive, a distance of approximately 1.31 miles. The proposed project corridor is within the City of Austin (COA), Travis County, Texas and includes the proposed locations of two water quality detention ponds: the first along SH 71 north of Covered Bridge Drive and the second between SH 71 and Old Bee Caves Road across from Sunset Ridge. The existing bridge over Williamson Creek and several culverts and/or drainage structures would be replaced or rehabilitated to accommodate the additional roadway width and new alignment. The project location is shown on **Figure 1** in **Attachment A**.

The Draft Environmental Impact Statement (EIS) committed to preparing updated indirect and cumulative impacts analyses prior to the release of the Final EIS. Since the release of the Draft EIS, TxDOT has decided to move forward with the proposed project as a non-tolled facility, public comment has resulted in design changes to the *Preferred Alternative*, and a range expansion for one of the federally listed salamanders was published. Therefore, the subsequent indirect and cumulative impacts analyses omit references to tolling, include the updated *Preferred Alternative* design, and discuss the new occurrence of a federally listed species within the indirect impacts study area.

Sections 2 through **5** of this technical addendum present the analysis conducted to assess the potential for indirect impacts associated with the proposed Oak Hill Parkway project's *Preferred Alternative*. The analysis provides definitions of direct and indirect impacts and also summarizes the TxDOT guidance utilized to determine the magnitude of potential indirect impacts.

2. Guidance

This section was developed using the TxDOT 2016 *Indirect Impacts Analysis Guidance* which is based on the 2002 National Cooperative Highway Research Program (NCHRP) Report entitled *NCHRP Report 466: Desk Reference for Estimating the Indirect Effects*

of Proposed Transportation Projects (NCHRP, 2002) and the American Association of State Highway and Transportation Officials (AASHTO) *Practitioner's Handbook 12: Assessing Indirect and Cumulative Impacts Under NEPA* (AASHTO, 2016).

The following indirect impacts analysis is based on several central definitions. In addition to direct effects, major transportation projects may also have indirect effects on land use and the environment. As defined by the Council on Environmental Quality (CEQ), indirect effects are "caused by an action and occur later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems" (40 Code of Federal Regulations [CFR] §1508.8). It should be noted that guidance documents use different terms, including "indirect effects" (AASHTO guidance) and "indirect impacts" (TxDOT guidance). For the purpose of this analysis, both terms are used and the meanings are the same.

NCHRP Report 466 (2002) identifies three broad categories of indirect effects:

1. **Encroachment-alteration effects**: These effects may result from changes in ecosystems, natural processes, or socioeconomic conditions that are caused by the proposed action but occur later in time or farther removed in distance. One example of this type of effect would be a change in habitat or flow regime downstream resulting from installation of a new culvert.

2. **Project-influenced development effects**: Sometimes called induced growth or the "land use effect." For transportation projects, induced growth effects are most often related to changes in accessibility of an area, which in turn affects the area's attractiveness for development. Indirect impacts associated with induced development are also similar to direct impacts but would occur in association with future land use development undertaken by others over the development horizon within a larger study area beyond the direct footprint of the proposed project.

3. **Effects related to project-influenced development**: These are impacts to the natural or human environment that may result from project-influenced changes in land use.

Probability is important in providing a distinction between direct and indirect effects because direct effects are generally inevitable, while indirect effects are merely probable. According to NCHRP Report 466 (2002), the term "reasonably foreseeable" means that effects are "sufficiently likely to occur that a person of ordinary prudence would take them into account in making a decision;" such effects are probable, not just possible. Further, "effects that can be classified as possible but not probable may be excluded from consideration" (NCHRP, 2002).

According to TxDOT's *Indirect Impacts Analysis Guidance* (TxDOT, 2016a), "whether an impact is substantial is a function of the context, the likelihood of the impact, and the reversibility of the impact." TxDOT rules define the term "significant" as it has been interpreted under NEPA and its related regulations. See 43 Texas Administrative Code (TAC) 2.5 (26). That interpretation includes the definition used in 40 CFR 1508.27, which focuses on context and intensity considerations. An agency must examine the context or setting in which the action occurs (e.g. national, regional, affected interests, and locality) and consider short- and long-term effects of the action. An agency must also analyze the intensity or severity of the impact. In doing so, the agency must consider: beneficial and adverse impacts to public health and safety; unique geographical characteristics; controversy related to effects on human environment, uncertainty, or unknown risks involved; precedent that may be set; relatedness of the action to other actions that would collectively create a cumulative impact that may be significant (significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment—and significance cannot be avoided by terming an action temporary or by breaking it down into small component parts); impacts to or loss of scientific or cultural resources; endangered species impacts; and any other violation of any other environmental protection law.

For the current analysis, encroachment-alteration effects are discussed in some of the resource-specific technical reports as well as in the direct impacts sections of the EIS, per current TxDOT direction. A summary of anticipated encroachment-alteration effects is provided in **Table 1**.

Table 1: Potential Encroachment-Alteration Effects

Resource	What encroachment-alteration effects are anticipated if any?
Waters of the U.S., including Wetlands	Anticipated fill impacts to waters of the U.S., including wetlands, would generally be limited to the project footprint. Temporary and permanent impacts to waters of the U.S. would not disrupt any natural processes in the project area. The construction of the Preferred Alternative would have limited encroachment-alteration effects because of the existing dense urbanization of the proposed project area and the incorporation of water quality best management practices.
Floodplains	The proposed project would result in encroachment-alteration effects within a regulatory floodplain. The proposed project would increase impermeable surfaces and have the potential to indirectly affect sediment and pollutant loading in the flood hazard areas as mapped by Federal Emergency Management Agency (FEMA). However, floodplain management regulations and design standards would require that the project be designed so as not to alter base flood elevations and not cause adverse flood impacts to upstream or downstream properties.

Table 1: Potential Encroachment-Alteration Effects	
Resource	**What encroachment-alteration effects are anticipated if any?**
Water Quality	Encroachment-alteration effects to water quality could occur primarily due to increased impervious cover or removal of vegetation that results in increased runoff and altered recharge (flow and quality) to the aquifer. Placement of the roadway could encroach on the surface or subsurface drainage areas of previously unknown adjacent caves/karst features, altering the hydrologic regimes in those features.
Federally Listed Threatened/Endangered Species	Encroachment-alteration effects could occur as a result of habitat loss due to increased development in the area, an increase in edge habitat, or an increase in impervious cover limiting recharge to the Edwards Aquifer. Both the Barton Springs and Austin blind salamanders are entirely dependent on the Edwards Aquifer. Changes to the aquifer as a result of decreased recharge or an increase in pollutants in stormwater runoff (stemming from increased impervious cover in the Recharge Zone) could potentially impact these species.
Vegetation and Wildlife Habitat (including habitat for state-listed species)	Encroachment-alteration effects stemming from the proposed project could result in additional loss and fragmentation of vegetation and habitat types on developable lands within the study area. Development in general encroaches on vegetation, and reductions in vegetation typically equate to reduced wildlife habitat. For this project, however, impacts to habitat would be limited to the area of direct impact which is generally developed and there would be no encroachment-alteration effects.
Air Quality	Encroachment-alteration impacts on air quality from mobile source air toxins (MSATs) are unquantifiable due to existing limitations in determining pollutant emissions, dispersion, and impacts to human health. Emissions would likely be lower than present levels in future years as a result of the United States Environmental Protection Agency's (EPA) national air quality regulations (i.e., new light-duty and heavy-duty on-road fuel and vehicle rules, the use of low sulfur diesel fuel). Even with an increase in vehicle miles travelled (VMT) and possible temporary emission increases related to construction activities, the EPA's vehicle and fuel regulations, coupled with fleet turnover, are expected to result in reductions of on-road emissions of MSATs and the ozone precursors VOC and NOx over time. For these reasons, encroachment-alteration impacts on air quality are not anticipated as a result of the proposed project.
Community Resources (includes businesses and residences)	The proposed project is anticipated to displace one residence and four businesses. Proposed right-of-way would be needed from 80 parcels. The majority of property acquisitions associated with the Oak Hill Parkway project would allow the remaining portions of the impacted parcels to function as their existing use. However, some businesses may be affected that are currently utilizing TxDOT's existing right-of-way for parking and access. The elimination of access and available parking may cause the eventual loss of business in these locations.

Table 1: Potential Encroachment-Alteration Effects	
Resource	**What encroachment-alteration effects are anticipated if any?**
Neighborhoods	The proposed project would add capacity to the existing facility. The proposed project would not serve to divide any of the existing neighborhoods or further divide the community. Access to some portions of the facility may change with implementation of the proposed project; however, the construction would be expected to reduce travel times for commuters within the adjacent neighborhoods and reduce cut through traffic along local roadways. It is likely that new neighborhoods will continue to be developed along the corridor and out to points west and north of the Oak Hill Parkway corridor, regardless of whether or not the improvements are constructed. Reduced congestion and improved conditions on US 290 and SH 71 would likely make neighborhoods along this corridor more desirable and could have the effect of increasing property values. Note that many other factors in addition to transportation mobility contribute to a property's value.
Environmental Justice	Encroachment-alteration effects would occur as the proposed project would change access and travel patterns within the project corridor. Based on the analysis of benefits and impacts, the proposed project would provide overall benefits to the socioeconomic resources in the project area including neighborhoods and communities, employment and economic activity, and public facilities. EJ communities are not expected to be subjected to disproportionately high and adverse effects.
Historic-Age Properties	Encroachment-alteration effects could include an increase in existing noise levels, visual impacts, or loss of access to a historic property, such that the encroachment-alteration effect diminishes the characteristics that cause a resource district to be historic. These indirect effects can alter the integrity of feeling or setting of historic properties. However, the proposed project would have no encroachment-alteration effects because it would have no direct effects and no adverse indirect effects on any of the National Register of Historic Places (NRHP)-eligible resources or the historic district.
Archeological Resources	No encroachment-alteration effects are anticipated as a result of the proposed project.

Source: Cox|McLain Environmental Consulting (CMEC), 2018.

Note: Separate technical reports or sections of the Final EIS documenting the direct impacts of the proposed project have been prepared for the resources listed in this table. Best available information was used during the preparation of this report to assess the impacts associated with encroachment-alteration effects.

In addition to encroachment-alteration effects, indirect impacts could also occur as a result of induced development associated with the proposed project. Project-influenced development effects are discussed in **Section 4.4**. Effects related to project-influenced development are discussed within the section on indirect effects potentially resulting from induced growth (**Section 4.5**). Planning judgment and cartographic techniques were employed in this analysis. Potential minimization and mitigation

measures are a focus of the TxDOT guidance and the AASHTO guidance and are discussed in **Section 4.6**.

As noted in the NCHRP guidance, "[i]ndirect effects can be linked to direct effects in a causal chain" (NCHRP, 2002). This analysis operates under the assumption that a proximate cause-effect relationship with the proposed project must be present in order for an indirect effect to occur. In cases where the proposed project would potentially contribute—but not be causally linked—to a potential effect, the contribution of the proposed project to this potential effect, when added to other past, present, and reasonably foreseeable future actions by others, is considered further in **Section 9: Cumulative Impacts Analysis**.

3. Scoping

Scoping is a process used to determine the extent of the analysis needed and to define the study area. Scoping should be considered at the earliest stages of project development. The scoping process has two overall goals: (1) determine the level of effort and approach needed to complete the analysis, and (2) determine the location and extent of the indirect impact study area. Scoping for the Oak Hill Parkway project, including indirect impacts, was conducted via the following methods:

- Regular coordination among the study team and the project's sponsors and stakeholders
- Agency stakeholder meetings
- Public involvement through public information meetings
- Distribution of a questionnaire to local agencies and organizations

The public and agency stakeholder meetings were used to introduce the project to the general public and agencies and to solicit comments and input on the project as it progressed. The public and agency stakeholder meetings that have been held to date are shown in **Table 2** on the next page.

These meetings have documented that, from an agency and stakeholder standpoint, there are two key resources for which potential indirect impacts are a concern: water quality and aquifer-dependent threatened and endangered species associated with the Barton Springs portion of the Edwards Aquifer. Past studies have been consulted and extensive data collection has taken place to ascertain connections between the proposed project and currently planned development, in addition to the potential for induced development. These resources and issues are primary considerations in this Technical Addendum.

Table 2: Public and Agency Stakeholder Meetings	
Meeting Type	**Date**
Oak Hill Envisioning Mobility Workshop	8/29/2012
Public and Agency Scoping Meeting	11/15/2012
Technical Working Group Meeting	12/17/2012
Environmental Workgroup Meeting	1/31/2013
Design Workgroup Meeting	2/19/2013
Oak Hill Parkway EIS Work Session with City of Austin	3/1/2013
Oak Hill Parkway Bike/Pedestrian Workshop	3/19/2013
Oak Hill Parkway Design Concept Preview Meeting	5/16/2013
Oak Hill Parkway Public Open House	5/23/2013
Evaluation Workgroup Meeting	9/30/2013
Oak Hill Parkway Public Open House	10/22/2013
Finance Workshop	3/22/2014
Oak Hill Parkway Public Open House	6/17/2014
Stakeholder Workgroup Meeting	8/26/2014
Context Sensitive Solutions (CSS) Workshop #1	10/09/2014
Oak Hill Parkway Public Open House	1/20/2015
Bicycle and Pedestrian Workshop	2/17/2015
Oak Hill Parkway City of Austin Coordination Meeting	2/27/2015
Context Sensitive Solutions (CSS) Workshop #2	4/7/2015
Water Quality Workshop	8/25/2015
Oak Hill Parkway Public Open House	10/29/2015
Stakeholder Meeting	4/13/2016
Informational Booths	4/23–4/24 and 4/30/2016
Stakeholder Meeting	6/8/2016
Environmental Workshop	6/23/2016

Source: CMEC, 2016.

4. Indirect Induced-Growth Impacts

This section describes the potential indirect induced growth caused by the proposed project, utilizing guidance from TxDOT's *Indirect Impacts Analysis Guidance* (TxDOT, 2016a). The following six steps are addressed in the induced growth impact analysis:

1. Define the methodology.
2. Define the Area of Influence (AOI) and study time frame.
3. Identify areas subject to induced growth in the AOI.
4. Determine if growth is likely to occur in the induced growth areas.
5. Identify resources subject to induced growth impacts.
6. Identify mitigation, if applicable.

Additional guidance utilized throughout the analysis includes the 2002 NCHRP report entitled *NCHRP Report 466: Desk Reference for Estimating the Indirect Effects of Proposed Transportation Projects* (NCHRP, 2002) and the NCHRP Project 25-25 Task 22 report entitled *Forecasting Indirect Land Use Effects of Transportation Projects* (NCHRP 2007).

4.1 Step 1—Define the Methodology

The risk assessment checklist for indirect induced growth provided in TxDOT's Environmental Compliance Toolkit was used to determine whether an indirect induced growth impacts analysis is required for the proposed project. **Table 3** summarizes the steps in the risk assessment checklist and confirms the need to conduct the indirect impacts analysis.

Table 3: Results of Risk Assessment for Indirect Impacts	
Does the Purpose and Need include economic development, or is the project proposed to serve a specific development?	No
Are economic development or new opportunities for growth/development cited as benefits of the project?	No
Is land in the project area available for development and/or redevelopment?	Yes
Does the project add capacity?	Yes
Is the project located in a rural area outside of the MPO boundary?	No
Does the project substantially increase access or mobility in the project area?	Yes
Is the project area experiencing population and/or economic growth?	Yes

Source: CMEC, 2016.

The techniques used for this analysis are primarily Planning Judgment, for which data was acquired by administering questionnaires and conducting phone interviews with planning professionals in the project vicinity; and Cartographic Techniques, in addition to expert technical analysis consistent with the methods described in NCHRP Report 466 and NCHRP Report 25-25.

4.2 Step 2—Define the AOI and Study Time Frame

The basic objective in creating an AOI is to delineate a study area within which all substantial project-related impacts are expected to occur. NCHRP Report 466 suggests that because indirect effects associated with a project can occur at a distance in time or space from the project itself, the study area for determining indirect effects is often broader than the study area associated with direct effects analysis. In order to distinguish it from the study areas considered for the analysis of direct effects of the project, the study area for the indirect effects analysis will be referred to as the AOI.

In October 2016, the project team held a scoping meeting for the Indirect and Cumulative Impacts analyses in accordance with TxDOT's *Indirect Impacts Analysis*

Guidance (2016a). Project team attendees at this meeting included representatives from the TxDOT Austin District, the TxDOT Environmental Division, and consultant representatives. The project team decided to use major roadways and political boundaries to identify the AOI and recommended development of an AOI that would include the cities of Austin, Bee Cave, Dripping Springs, and Sunset Valley. The physical boundaries of the AOI are bordered by Loop 360, RM 2244/Bee Cave Road, SH 71, RM 3238/Hamilton Pool Road, Crumley Ranch Road, Farm-to-Market Road (FM) 101/Fitzhugh Road, RM 12, RM 150, RM 1826, Slaughter Lane, and Brodie Lane. The AOI encompasses an area of approximately 85,281 acres. This AOI was based on the following factors: the neighborhoods and areas best served by the proposed roadway improvements; the areas most likely to be potentially opened for development following construction of the roadway; the natural resources that could be potentially indirectly impacted; and discussions with local planning experts in the municipalities and counties in, adjacent to, and near the project area. The AOI includes some or all of the cities of Austin, Bee Cave, Bear Creek, Dripping Springs, and Sunset Valley. During the investigation process, questionnaires were submitted to these entities; none of those interviewed had questions or raised concerns about the proposed boundaries of the AOI, so no changes were made to the AOI as a result of the interview process. See **Figure 2** in **Attachment A** for a map of the AOI.

A temporal frame of reference is necessary when analysing the range of impacts that may be caused by the proposed project in the future. The discussion below considers indirect induced growth impacts that may occur between the time of project construction (2019) and 2040. This time frame captures the 2037 horizon year for the *Our Bee Cave 2037 Comprehensive Plan*, the 2039 horizon year for the City of Austin's *Imagine Austin* Comprehensive Plan, and the 2040 horizon year for the Capital Area Metropolitan Planning Organization's (CAMPO) *2040 Plan* (CAMPO, 2015).

4.3 Step 3—Identify Areas Subject to Induced Growth in the AOI

This section includes a discussion of currently developed land within the AOI, land that is planned for or currently under development, and land that has indirect induced growth potential. This Cartographic Technique exercise utilized data collected remotely and in the field combined with an analysis of various constraints layers and the proposed alignment utilizing Geographic Information Systems (GIS) technology. In addition, the results of questionnaires sent to planning experts were incorporated to the extent the information could be mapped. A summary of the interviews conducted is included in **Section 4.4.3** with a summary of key points made by those who participated.

Some changes in land use could occur within the AOI if undeveloped areas are developed; such changes may be, in part, the result of enhanced access to previously

undeveloped land. To determine the potential for induced growth, existing land uses within the AOI were quantified (see **Table 4**). **Figure 3** in **Attachment A** shows land within the AOI depicted as developed, available for development, or other lands considered to be undevelopable such as parks, Water Quality Protection Lands (WQPLs), and preserves.

Table 4: Acres of Land Available for Project-Influenced Development within the AOI

Existing Land Uses	Acres	Percentage of Total (%)
Total Developed Land	49,081	57.6
Transportation (Roads, ROW)	4,408*	5.2
Other Developed Land	44,673	52.4
Undevelopable Land	17,617	20.7
Parks or Open Space	6,924	8.1
Water Quality Protection Lands	9,563	11.2
Floodplains	1,130	1.3
Developable Land within the AOI	18,638	21.9
Planned and Emerging Development Projects within Developable Land within the AOI	8,446	9.9
Developable Land Minus Planned and Emerging Projects within the AOI	10,192	12.0
Total Area within the AOI	85,281	100.0

Source: CMEC, 2016-2017.

*Contains the sum of AOI acres not captured in other categories (i.e. not accounted for in the CAD data, parks/WQPL, proposed development, or floodplains).

Within the 85,281 total acres of the AOI, approximately 49,081 acres (57.6 percent) are already developed (including roadways, state-owned right-of-way, and other developed land). Approximately 17,617 acres (20.7 percent) are undevelopable including parks, floodplains, and WQPLs. Within the AOI, WQPLs (both those owned outright by the City of Austin and those which have conservation easements placed on them) account for 9,563 acres (11.2 percent). WQPLs have been protected from development in perpetuity and the City of Austin notes that water or wastewater service will not be extended to any lands that belong to the City of Austin or that have conservation easements on them. Floodplains cover 1,130 acres of the vacant land within the AOI and are also considered undevelopable.

There are currently approximately 8,446 acres of land in the AOI that are under construction or are planned or platted for development. This analysis assumes land that is under construction or already planned or platted for development would not be subject to induced development as a result of the proposed project. Development of land that is already planned or platted, regardless of development project status, is considered probable and reasonably foreseeable and not dependent on the proposed project.

Planning experts representing each of the municipalities within the AOI were contacted for information about planned developments within their jurisdictions. Responses from several municipalities were pending as of April 2017. See **Section 4.4.3** and **Table 11** for a full listing of municipalities and agencies contacted and a summary of responses received. Based on information provided by the Cities of Austin, Bee Cave, and Dripping Springs, several projects are in various stages of development, ranging from under review to under construction. Removing these projects from the stock of developable land in the AOI yields approximately 10,192 acres available for future development (12.0 percent of the AOI). A list of developments in progress is included in **Table 5;** a listing of numerous City of Austin emerging projects is provided in **Attachment B**.

Table 5: Planned and Emerging Development Projects on Developable Land within the AOI

Planned / In Progress Development Project in AOI	Entity	Development Type	Approximate Acres	Project Development Stage
Village Green	Bee Cave	Mixed Use	5.2	Planned
Bee Cave Territory Subdivision at Spanish Oaks			4.4	Planned
Spanish Oaks Hillside		Residential	100.0	Planned
Anarene	Dripping Springs	Residential	1,692.4	Planned
Butler Ranch			152.2	Under construction
Founders Ridge			107.0	Under construction
Belterra			1,536.5	Under construction
Driftwood			453.3	Partially patted / under construction
Headwaters			1,503.7	Phase 2 under construction
Ledgestone			197.8	Residential constructed. Commercial planned / partially platted.
Parten Ranch			532.6	Phase I platted / under review
Garnett			150.7	Planned
See listing in Appendix B	Austin	Varies	Varies	Emerging

Sources: Data from responses to questionnaires sent to municipalities and agencies within the AOI.

4.4 Step 4—Determine if Growth is Likely to Occur in the Induced Growth Areas

4.4.1 Regional and Local Trend Data for Population, Household, and Employment Growth

This section includes information about historical trends within the AOI. In general, this area of southwest Travis/northwest Hays County has grown considerably during the past three decades. This growth is seen in population change, housing starts, and employment growth over time.

The Austin area has experienced significant and sustained population growth over the last 25 years, with the populations of Hays and Travis counties increasing by 196.8 percent and 104.1 percent, respectively, over the period from 1990 to 2015 (U.S. Census Bureau, 1990, 2000, 2010, and 2011-2015). The City of Austin grew by 97.4 percent, the City of Bee Cave grew by more than 25 times its 1990 population, the City of Sunset Valley grew by 113.5 percent, and the City of Dripping Springs grew by 140.4 percent. The Village of Bear Creek grew by 7.8 percent between 2000 (the earliest census data available) and 2014. Population changes for Travis County, Hays County, and the study area communities are shown in **Tables 6** and **7**.

Table 6: Current and Historic Population Growth in the AOI

City or County	Total Population by Year				% Change from 1990 - 2015
	1990	2000	2010	2015	
City of Austin	472,020	656,562	790,390	931,830	97.4
City of Bee Cave	241	656	3,925	6,292	2,510.8
City of Sunset Valley	327	365	749	698	113.5
City of Dripping Springs	1,033	1,548	1,788	2,483	140.4
Village of Bear Creek	Prior to incorporation*	360	382	388	N/A
Travis County	576,407	812,280	1,024,266	1,176,558	104.1
Hays County	65,614	97,589	157,107	194,739	196.8

Sources: Texas State Historical Association (2016); U.S. Census Bureau 1990 Census; U.S. Census Bureau 2000 Census; U.S. Census Bureau 2010 Census; U.S. Census Bureau, American Community Survey 2011-2015.

*Census information is unavailable for unincorporated communities.

The City of Austin and Travis County are expected to grow by 68 percent and 69 percent, respectively, between 2010 and 2040, while Hays County is expected to grow more than 150 percent according to the Texas Water Development Board (TWDB, 2016).

Table 7: Projected Population Growth in the AOI					
City or County	Total Population by Year				% Change from 2010 - 2040
	2010	2020	2030	2040	
City of Austin	790,390	976,418	1,153,977	1,330,492	68.3
City of Bee Cave	3,925	4,470	5,473	6,165	57.1
City of Sunset Valley	749	1,134	1,480	1,806	141.1
City of Dripping Springs	1,788	2,031	2,311	2,652	48.3
Village of Bear Creek	382	NA*	NA*	NA*	NA*
Travis County	1,024,266	1,273,260	1,508,642	1,738,860	69.3
Hays County	157,107	238,862	313,792	398,384	153.6

Sources: U.S. Census Bureau 2010 Census; TWDB (2016).

*Note that the Texas Water Development Board does not provide population projections for Bear Creek.

Residential new house construction is another indicator of growth trends. **Table 8** provides information on new house construction by year between 1997 and 2014 for jurisdictions within the AOI.

Table 8: Single-Family New House Construction				
Year	City of Austin	City of Bee Cave	City of Dripping Springs	City of Sunset Valley
1997	2,380	33	N/A	3
1998	3,521	38	N/A	3
1999	3,302	42	N/A	N/A
2000	3,361	40	N/A	31
2001	2,119	9	N/A	13
2002	2,431	10	6	7
2003	3,117	15	13	2
2004	3,533	95	5	4
2005	4,569	110	11	N/A
2006	4,340	113	17	26
2007	3,155	59	9	21
2008	1,928	117	5	13
2009	1,951	108	4	N/A
2010	1,664	153	5	N/A
2011	1,713	135	24	3
2012	2,539	189	12	N/A
2013	2,573	127	49	4
2014	2,800	146	82	1

Source: City-Data.com (2016).

*Total provided for available time period. Data were not available for the community of Bear Creek. Note that only part of Austin, Bee Cave, and Dripping Springs fall within the AOI.

Table 9 includes data from 1970 to the present and shows that the period between 1990 and 1999 was the decade in which the largest portion of development occurred within the AOI. The largest percentage of development in Travis and Hays counties and the City of Austin occurred between 2000 and 2009.

Table 9: Number of Structures Built and Percent Built by Decade for Entities in the AOI Between 1970 and 2010 or Later

Geography	Total Homes	Year Structure Built and Percent of Houses Built in that Decade									
		1970-1979		1980-1989		1990-1999		2000-2009		2010 or later	
		#	%	#	%	#	%	#	%	#	%
Hays Co.	67,463	5,813	8.6%	11,809	17.5%	12,623	18.7%	25,708	**38.1%**	5,118	7.6%
Travis Co.	464,197	76,476	16.5%	91,474	19.7%	81,858	17.6%	118,018	**25.4%**	17,084	3.7%
Austin	380,280	70,426	18.5%	79,241	20.8%	62,066	16.3%	82,928	**21.8%**	12,189	3.2%
AOI*	41,245	4,537	11.0%	8,326	20.2%	12,840	**31.1%**	12,689	30.8%	1,767	4.3%

Source: U.S. Census Bureau, American Community Survey 2011– 2015 (B25034 – Year Structure Built).

Note: Decade with Highest Percentage in Bold. Travis County data includes some City of Austin data.

*Includes Travis County Census Tracts 17.33, 17.37, 17.38, 17.40, 17.49, 17.50, 17.68, 17.69, 17.76, 17.77, 19.08 19.14, 19.15, 19.16, and 19.17; and Hays County Census Tracts 108.05, 108.06, and 108.09.

Table 10 contains information on employment projections from the CAMPO *2040 Plan.* Employment growth in Hays County is predicted to be more than 460 percent between 2010 and 2040, compared to approximately 112 percent over the same time period in Travis County. This is largely due to the fact that more land in Travis County has already been developed, compared to Hays County which continues to develop.

Table 10: CAMPO Projected Employment by County/Percent Growth 2010-2040

County	2010 Employment	Projected Employment			% change 2010 - 2040
		2020	2030	2040	
Hays	48,052	89,505	157,832	270,173	462.3
Travis	564,517	760,518	970,962	1,195,673	111.8

Source: CAMPO (2015), *2040 Regional Transportation Plan*

4.4.2 Summary of Local Plans

City of Austin—Imagine Austin

Of the 85,281 acres in the AOI, approximately 54.9 percent (46,841 acres) lies within the City of Austin's jurisdiction or extra-territorial jurisdiction (ETJ). Approximately 21.0 percent (17,923 acres) of land within the AOI is part of the City's full and limited purpose jurisdictions, and 33.9 percent (28,918 acres) of the AOI lies within the City of Austin's two-mile and five-mile ETJs. In the ETJs, the City of Austin has no zoning authority but development is subjected to city subdivision and water/wastewater regulations. Land within a city's ETJ may be annexed in the future, bringing development in these areas under the city's zoning and permitting requirements.

The City of Austin has enacted several watershed protection ordinances over the last three decades to protect water quality through land use and development controls (COA, 2013a, 2013b, 2013c). To this end, the western Drinking Water Protection Zone (DWPZ)—in which the AOI is located—and the eastern Desired Development Zone (DDZ) were created with the goal of funneling development into the DDZ through the use of development incentives (COA, 2012). This goal of directing growth east and south into the DDZ is echoed in the *Imagine Austin Comprehensive Plan*, which was adopted in 2012 to guide growth and development in the City of Austin. The *Imagine Austin Comprehensive Plan* included extensive public outreach and was adopted by the Austin City Council in June 2012 (COA, 2012).

City of Austin—Urban Trails Master Plan

The City of Austin adopted the *City of Austin Urban Trails Master Plan* in the fall of 2014 in order to create a streamlined and accessible process for the development of urban trails (COA, 2014). The *Urban Trails Master Plan* is consistent with the City of Austin's 2012 *Imagine Austin Comprehensive Plan.*

Several existing and future planned urban trails cross the AOI. These include the Mopac Bicycle and Pedestrian Bridge which will provide a bicycle and pedestrian bridge over Loop 360 at Mopac; the "Y" at Oak Hill to Barton Creek Urban Trail which would connect the Oak Hill neighborhoods to the Barton Creek area of Austin; and the Violet Crown Trail, a partially-constructed 30-mile urban trail which, upon completion, will connect the Lady Bird Johnson Wildflower Center in southwest Austin to Zilker Metropolitan Park near downtown Austin.

City of Austin—Oak Hill Combined Neighborhood Plan

The Oak Hill Combined Neighborhood Plan, adopted in 2008, presents specific goals for the West of Oak and East Oak Hill neighborhoods in the City of Austin. This neighborhood plan is the product of extensive stakeholder involvement and identifies specific major goals for the neighborhoods, including the following:

- Preserve and enhance environmental resources including watersheds, air quality, and wildlife corridors.
- Coordinate with appropriate entities to provide safe access across major thoroughfares and alleviate cut-through traffic on already overburdened neighborhood streets.
- Provide inter-connectivity among parks, public services and destinations in and beyond Oak Hill.
- Ensure and create safe pedestrian and bike corridors across major highways and throughout the neighborhood that connect to commercial centers and public parks and resources.
- Provide managed connectivity between various neighborhoods while maintaining the quiet enjoyment of neighborhoods.
- All Oak Hill residents should have readily accessible, quality community and public services. (COA, 2008: xiii–xxxii)

City of Bee Cave Comprehensive Plan

A small portion of the AOI falls within the City of Bee Cave (2.2 percent or 1,909 acres). Bee Cave's ETJ covers approximately 2.9 percent (2,499 acres) of the AOI. The Bee Cave City Council adopted an updated Comprehensive Plan, *Our Bee Cave 2037,* on November 22, 2016 (City of Bee Cave, 2016a). The plan calls for the City of Bee Cave to "Work in partnership with surrounding communities and regional government agencies to support the region's mobility goals, transportation system sustainability, and quality of life" (City of Bee Cave, 2016a: 46).

City of Bee Cave Hike and Bike Trail Connectivity Plan

The Bee Cave City Council adopted a Hike and Bike Trail Connectivity Plan on November 22, 2016 (City of Bee Cave, 2015). The plan discusses the traffic network, traffic safety conditions, traffic congestion, and public transit in Bee Cave. Goals identified in the plan include providing connections to all the neighborhoods in Bee Cave and reducing traffic congestion by providing an alternative to driving (City of Bee Cave, 2015: 5).

City of Dripping Springs

A small portion of the AOI falls within the City of Dripping Springs (1.9 percent, or 1,660 acres). The Dripping Springs ETJ is considerably larger than the full purpose area of the city and covers approximately 31.2 percent, or 26,606 acres, of the AOI. The City of Dripping Springs Comprehensive Plan was adopted in 2010 (City of Dripping Springs, 2010). The Plan is organized around the six values: Dripping Springs is a sustainable community; Dripping Springs is a community that cherishes its unique heritage; Dripping Springs is an active community; Dripping Springs is a community with a vibrant economy; Dripping Springs is a community with high quality infrastructure; and Dripping Springs is a community that welcomes all residents. Within the plan, the City of Dripping Springs established a goal related to the stated value of being a community with high quality infrastructure to "develop an efficient transportation network (City of Dripping Springs, 2010: 49 – 50).

City of Sunset Valley

A small portion of the AOI falls within the City of Sunset Valley (1.0 percent or 883 acres). Sunset Valley's ETJ covers less than 0.1 percent, or 59 acres, of the AOI. The Comprehensive Plan for the City of Sunset Valley was adopted in 2011 and includes the city's policy toward land use, development and redevelopment, capital improvements, and the provision of services within the incorporated area and its ETJ (City of Sunset Valley, 2011). The City of Sunset Valley Comprehensive Plan includes goals to preserve and protect the quality of life and preserve the community's natural resources, among others (City of Sunset Valley, 2011: 4).

Village of Bear Creek

Less than one percent of the AOI is within the Village of Bear Creek (693 acres or 0.8 percent). Bear Creek is a village of approximately 403 people, and no articulated or published goals have been developed.

Hays County

Approximately 701 acres of the AOI lie outside the boundaries of incorporated areas and their associated ETJs in Hays County. Because the City of Austin's development code and water quality protection incentives seek to manage growth in the environmentally sensitive lands within the AOI, anticipated future population growth and development in the area may migrate to vacant, developable lands within the AOI. Hays County recognizes that this future growth will put pressure on the existing transportation system; the 2013 *Hays County Transportation Plan* (amended in 2016) cites this anticipated future growth and its resultant impacts on traffic congestion as

contributing to an increased need for new and improved roadway facilities (Hays County, 2016).

Hays County Regional Habitat Conservation Plan

Hays County has a stated goal of providing local solutions for conserving endangered species, open space, and cultural heritage. Adopted by Hays County Commissioners in 2013, the *Hays County Regional Habitat Conservation Plan* (RHCP) "provides a locally controlled approach for compliance with the Federal Endangered Species Act (ESA) by allowing the county to offer mitigation credits for otherwise lawful development on land where there could be 'incidental takings' of protected species." In Hays County, the RHCP could protect numerous species considered rare or threatened. The approved RHCP allows landowners who have qualifying habitat acreage and want to preserve it as open space to voluntarily donate or sell it to Hays County. In turn, Hays County can help streamline public projects and private development in areas where the ESA applies by providing "credits" that offset the "takings" of land where protected species might be impacted. Hays County initially plans to offer the credits for development at "$7,500 per credit acre" according to Hays County's website about the RHCP (Hays County, 2014).

Travis County

Approximately 3,431 acres of the AOI lie outside the boundaries of incorporated areas and their associated ETJs in Travis County. Travis County's Department of Transportation and Natural Resources (TNR) is responsible for:

- The engineering, design, construction, and maintenance of Travis County roads, drainage and bridges
- Fleet services for all county vehicles and equipment
- Environmental protection
- Solid waste management and resource conservation
- County parks and natural resource preservation
- Capital improvement projects
- Land development review, permits, and flood plain management regulations in Travis County (Travis County, 2016a)

According to the TNR's *Travis County Capital Improvement Projects* (Travis County 2016b), one bridge replacement or rehabilitation project, one drainage project, and one sidewalk project are proposed within the AOI.

Travis County and City of Austin—Balcones Canyonlands Conservation Plan (BCCP)

In recognition of the common goal of protecting endangered species with habitat located in the City of Austin and in Travis County, these entities undertook creation of a RHCP as a vehicle for compliance with the ESA. The BCCP was a plan written by the City of Austin and Travis County in order to obtain an incidental take permit for Golden-cheeked Warblers, Black-capped Vireos, and six species of federally endangered karst invertebrates under section 10(a)(1)(B) of the ESA. The take covered by the permit would include direct and indirect takes associated with grading, clearing, or other earth-moving activities necessary for residential, commercial, or industrial development and infrastructure projects as well as indirect impacts, such as noise, predation, and harassment from the occupancy and use of these structures.

As part of the BCCP, approximately 30,428 acres of Golden-cheeked Warbler and Black-capped Vireo habitat will be protected within a preserve system called the Balcones Canyonlands Preserve (BCP). The BCCP includes the goal of protecting 62 caves. The habitat protected by the BCP is considered to be some of the highest quality and least fragmented habitat of any county in the Golden-cheeked Warbler's range. Areas covered by the BCCP in the event of incidental take include all of Travis County with the following exceptions: the BCP, portions of the Balcones Canyonlands National Wildlife Refuge (BCNWR) that fall within Travis County, and areas within city limits and planning jurisdictions of municipalities that are not participating in the BCCP. The permit was issued for a period of 30 years and will expire or be eligible for renewal in 2026 (City of Austin & Travis County, 1996).

CAMPO

CAMPO is responsible for transportation planning in the six-county Austin metro region, which includes Hays and Travis counties. The vision statement for their *2040 Plan* is: "Develop a comprehensive, multimodal, regional transportation system that safely and efficiently addresses mobility needs over time, is economically viable, cost-effective and environmentally sustainable, supports regional quality of life, and promotes travel options" (CAMPO, 2015:11). The proposed project is included in this regional plan as a six-lane tolled turnpike with frontage roads along US 290 from west of RM 1826 to Loop 1 (Mopac).

4.4.3 Potential for Induced Development: Data from Planning Expert Questionnaires and Interviews

The preceding sections have demonstrated the strong potential for growth and the planning framework within which that growth would occur in the AOI during the analysis period of 2019–2040. This section will evaluate the nature of this growth and attempt to determine whether it can be causally linked to the proposed project. The evaluation

of whether the proposed project is likely to result in project-induced land use change is patterned after the procedures in *NCHRP Project 25-25, Task 22*. Project-induced land use change can include project-induced development, the redevelopment of previously developed land, or a change in the rate of development/redevelopment. In order to make reasonable judgments about potential project-induced impacts, the Planning Judgment forecasting tool incorporated data collected via questionnaires and phone interviews with planning professionals in the project vicinity, and ultimately incorporated data collected from numerous professionals with relevant expertise. The previously described scoping meeting and use of questionnaires coordinated with planning professionals were utilized to define the AOI and study timeframe in accordance with TxDOT's *Indirect Impacts Analysis Guidance* (TxDOT, 2016a).

A questionnaire was sent to agencies, organizations, governmental jurisdictions, and water supply corporations within the project's AOI. The questionnaire and AOI map (**Attachment C**) were emailed to each organization listed in **Table 11** on November 8, 2016. Follow up emails were sent to organizations that had not replied on November 18, 2016. Follow-up calls were placed in November and December 2016.

Table 11: Indirect Impacts Questionnaire Respondents		
Organization	**Follow-up Phone Calls/Emails**	**Response Received***
City of Austin	11/18/2016; 12/5/2016; 12/12/2016	1/10/2017
City of Sunset Valley	11/18/2016	
City of Bee Cave	11/18/2016	11/23/2016
City of Dripping Springs		Questionnaire 11/17/2016; Phone interview 12/2/2016
Village of Bear Creek	11/18/2016	
Travis County Transportation & Natural Resources	11/18/2016	
Hays County Development Services Department	11/18/2016	
Austin Independent School District	11/18/2016	
Hays County Independent School District	11/18/2016	
Dripping Springs Independent School District	11/18/2016	
Capital Metropolitan Transportation Authority		
Capital Area Metropolitan Planning Organization	11/18/2016	11/21/2016
Capital Area Council of Governments		11/11/2016
Barton Springs Edwards Aquifer Conservation District	11/18/2016	11/21/2016
Lower Colorado River Authority	11/18/2016	
West Travis County Public Utility Agency		11/9/2016

Source: CMEC, 2016.

*Blank cells indicate no response received.

The planning experts were asked where development is expected to occur and whether the proposed project would induce growth. Specifically, the interviewees were asked the following questions:

- Are you aware of any substantial proposed land developments within your jurisdiction or area? If so, please mark the areas on the attached map and provide the location, type, and size (e.g. acres, density, number of units) of any planned developments. Also, please indicate if any of the proposed land developments that you identified on the attached map have been platted.

- Please identify parcels (if any) that you think would likely be developed by 2040 as a result of the proposed project that would not otherwise be developed.
- Would the proposed project affect the rate of land development in your jurisdiction?
- Is the proposed project consistent with local planning efforts (i.e. master or comprehensive plans, growth management plans, zoning or land use policies, etc.)?
- Are there other capital improvement projects—such as water or sewer infrastructure, school, or hospital construction—that are planned for the area which might affect development in the project vicinity?
- Are there any factors that could limit growth in the area, such as floodplains, current development, conservation easements, protected lands, etc.?
- How would the proposed project be expected to impact travel patterns in the area? Which roadways would benefit from the proposed project? How do people in the project area get to Austin now?
- What type of traffic would you anticipate to use this facility (i.e. local traffic, regional commuters, through traffic)?
- Do you have any comments on the proposed AOI or do you think it is a reasonable study area for an assessment of indirect impacts that may result from the proposed project?

Respondents provided information on reasonably foreseeable future developments, which will be discussed in **Section 9: Cumulative Impacts Analysis**. Survey responses had several common threads:

- Respondents do not think the proposed project would specifically affect development, given the existing high rate of growth in the area overall.
- The proposed project is consistent with local planning efforts.
- Several land use and transportation projects are underway or are planned for the area within the AOI.
- Factors limiting growth include the availability of water and sewer service as well as local, state, and federal regulations.
- Respondents anticipate the project to be used most heavily by regional commuters.

Key points made by specific respondents to the questionnaire or during an interview include:

- City of Bee Cave:
  - Respondent was uncertain whether any particular parcels would likely be developed by 2040 as a result of the proposed project that would not otherwise be developed.
  - If the proposed project includes efforts to add/improve bike lines/buffered bike lanes/shared lanes/enhanced crossings, etc., it could work to provide further connectivity to existing areas where shoulders currently serve in this capacity. Also, the technical appendix of the CAMPO 2040 Plan indicates that RR 620 has a bike facility in the form of a designated shoulder.
  - The project is consistent with local planning efforts.
  - The opportunity to provide reliever roadways to major state highways is restricted by topography and three large nature preserves.
  - The project should help to better serve the existing and projected travel needs and would be of value to local circulation and safety.
- City of Dripping Springs
  - Growth in Dripping Springs has been rapid and the city expects growth to continue at a steady pace, barring another major economic downturn. Both Dripping Springs ISD (DSISD) and the charm of the Hill Country are big draws that will continue to drive growth.
  - All new developments will require creation of new utility districts and/or extension of existing service lines.
  - DSISD has planned the addition of new schools in response to the rapid growth they are currently experiencing within their district boundaries.
  - The most important factors limiting growth are water supply, wastewater disposal, and water quality.
  - The Oak Hill Parkway is not expected to affect existing travel patterns. US 290 would greatly benefit from these improvements. The primary arteries to Austin are US 290 and FM 1826.
  - Respondent anticipates that local traffic, regional commuters, and through traffic will use the facility.

- Barton Springs Edwards Aquifer Conservation District
  - The proposed Oak Hill project would likely greatly improve the flow of commuter traffic to and from Austin.
- Capital Area Metropolitan Planning Organization
  - The project is currently part of *CAMPO's 2040 Plan*.
- Capital Area Council of Governments
  - The Capital Area Council of Governments deferred to local governments in the project AOI (Travis and Hays Counties and the Cities of Dripping Springs, Bear Creek, Bee Cave, Sunset Valley, and Austin).
- West Travis County Public Utility Agency (WTCPUA)
  - The proposed project would not affect the rate of land development.
  - The project is needed immediately.
  - Factors that could limit growth in the area include the availability of public water and sewer service and regulatory matters from federal, state, and local bodies.
  - The WTCPUA currently treats approximately 14 million gallons per day (MGD) of surface water for potable drinking water. The WTCPUA Board has adopted a policy that the public utility agency will not expand beyond a treatment and delivery capacity of 32.5 MGD.
  - WTCPUA's contracted demographic studies indicate a total build-out of its retail service area would potentially demand 45 MGD of treatment capacity for domestic drinking water.

4.5 Step 5—Identify Resources Subject to Induced Growth Impacts

4.5.1 Cartographic Analysis

Based on input from planning professionals and a cartographic assessment, approximately 10,192 acres of land have indirect induced growth potential within the AOI. The Ecological Mapping Systems of Texas (EMST) was used to determine which resources are present in the multiple areas identified for potential development; **Table 12** summarizes the characteristics of resources present in developable areas.

Table 12: Resource Characteristics in Areas of Potential Development	
EMST	**Acres**
Row Crops	7
Barren	10
Native Invasive: Deciduous Woodland	13
Native Invasive: Juniper Shrubland	6
Native Invasive: Juniper Woodland	4
Native Invasive: Mesquite Shrubland	122
Edwards Plateau: Ashe Juniper Slope	271
Edwards Plateau: Live Oak Slope Forest	3
Edwards Plateau: Oak / Ashe Juniper Slope Forest	151
Edwards Plateau: Oak / Hardwood Slope Forest	11
Edwards Plateau: Ashe Juniper Motte and Woodland	2,491
Edwards Plateau: Deciduous Oak / Evergreen Motte and Woodland	1,494
Edwards Plateau: Live Oak Motte and Woodland	919
Edwards Plateau: Oak / Hardwood Motte and Woodland	182
Edwards Plateau: Post Oak Motte and Woodland	14
Edwards Plateau: Savanna Grassland	1,605
Edwards Plateau: Ashe Juniper / Live Oak Shrubland	1,607
Edwards Plateau: Ashe Juniper / Live Oak Slope Shrubland	36
Edwards Plateau: Shin Oak Shrubland	10
Edwards Plateau: Shin Oak Slope Shrubland	5
Edwards Plateau: Floodplain Ashe Juniper Forest	4
Edwards Plateau: Floodplain Ashe Juniper Shrubland	3
Edwards Plateau: Floodplain Hardwood / Ashe Juniper Forest	22
Edwards Plateau: Floodplain Hardwood Forest	4
Edwards Plateau: Floodplain Herbaceous Vegetation	3
Edwards Plateau: Riparian Ashe Juniper Forest	135
Edwards Plateau: Riparian Ashe Juniper Shrubland	53
Edwards Plateau: Riparian Deciduous Shrubland	6
Edwards Plateau: Riparian Hardwood / Ashe Juniper Forest	107
Edwards Plateau: Riparian Hardwood Forest	14
Edwards Plateau: Riparian Herbaceous Vegetation	31
Edwards Plateau: Riparian Live Oak Forest	23
Open Water	3
Blackland Prairie: Disturbance or Tame Grassland	3
Urban High Intensity	38
Urban Low Intensity	782
Total	**10,192**

Sources: CMEC, 2016-2017; EMST, 2016.

TxDOT (2016a) and AASHTO (2011) indirect impact assessment guidance require consideration of potential impacts to sensitive resources. Cartographic analysis was used to determine which resources are present in areas within the AOI that have indirect induced growth potential. The connection between construction of the

proposed Oak Hill Parkway project and development is most apparent for undeveloped parcels located within the AOI. Land redevelopment has not been further investigated because planning professionals interviewed for this analysis are not aware of specific redevelopment plans at this time. Results of the cartographic analysis, including quantifications of resources potentially subject to induced growth impacts, are provided in the next section.

4.5.2 Resource Characteristics in Area of Potential/Induced Development

Table 13 includes a description of resources present in the areas of potential development within the AOI. See **Figure 3** in **Attachment A** for a map showing the 10,192 acres of developable land within the AOI. No formal surveys for historic-age properties and archeological resources have been conducted throughout all of the areas of potential development at the time this report was prepared. Preliminary consultation with TxDOT-developed potential archeological liability maps (PALM) indicates low to moderate potential for archeological impacts within the areas of potential development.

Table 13: Resources Analyzed for Induced Growth Impacts

Resource	Could the resource be indirectly impacted by potential induced growth?	Is this resource at risk?
Waters of the U.S., Including Wetlands	Formal wetland delineations have not been conducted within all of the areas of potential development; however, if it was determined that the wetlands and waters were Waters of the U.S., then they would be protected by Section 404 of the Clean Water Act (CWA).	No. The U.S. Army Corps of Engineers (USACE) regulates the discharge of dredged and fill material into waters of the U.S., including wetlands, under Section 404 of the CWA.
Floodplains	Yes. Approximately 1.3 percent of currently undeveloped land in the AOI (1,148 acres) are within the 100-year floodplain.	No. Future construction within the 100-year floodplain would be in compliance with appropriate permitting and general land use policies.
Water Quality	Yes. Future development within the AOI would cause an increase in impervious cover that could increase pollutants entering receiving waters during storm events.	Yes. Stormwater runoff from the western end of the project area could enter Slaughter Creek, which has been identified by the TCEQ as an impaired assessment unit. During construction, exposed soil could runoff into streams and increase turbidity and sediment loading downstream.

Table 13: Resources Analyzed for Induced Growth Impacts		
Resource	**Could the resource be indirectly impacted by potential induced growth?**	**Is this resource at risk?**
Federally Listed Threatened/Endangered Species	Yes. The United States Fish and Wildlife Service (USFWS) Information for Planning and Conservation species list identifies a number of threatened or endangered species that could potentially be present within the AOI. The project is located within the Edwards Aquifer Recharge Zone and project runoff could contribute to water quality impacts downstream of the project location. Recharge from lower Williamson Creek has been documented by dye trace studies to flow to the Barton Springs complex, which is occupied habitat for the Barton Springs salamander and Austin blind salamander (BSEACD 2003, 2014a; Hauwert, et al., 2004; Hunt et al., 2006).	Yes; however, the ESA affords protection for federally listed threatened and endangered species and their habitats. The USFWS maintains lists of potential occurrence for listed species in each Texas county. All development, whether public or privately funded, is subject to federal regulations.

Table 13: Resources Analyzed for Induced Growth Impacts		
Resource	**Could the resource be indirectly impacted by potential induced growth?**	**Is this resource at risk?**
Vegetation and Wildlife Habitat (Including Habitat for State-Listed Species)	Yes. The areas of potential development are vegetated to varying degrees and provide wildlife habitat. Yes. The Texas Parks and Wildlife Department (TPWD) maintains lists of potential occurrence for listed species in each Texas county. The TPWD annotated list identifies a number of state-listed species that could potentially be present within the AOI.	No. There has been a trend of conversion of natural areas to development over the recent past. However, the conservation entities charged with protecting endangered species and sensitive resources have plans in place to continue to protect sensitive habitats. For example, the City of Austin has developed regulations regarding buffer zone setbacks to protect critical environmental features as well as impervious cover limits as part of the Land Development Code. The city, in conjunction with Travis County, has also established the Balcones Canyonlands Conservation Plan (BCCP) to protect natural habitat areas. Approximately 20% of the AOI is represented by lands protected in perpetuity specially acquired for that purpose, providing regulatory means by which substantial environmental impacts caused by development would be minimized. No. State regulations prohibit harm to individuals of state-listed species. All development, whether public or privately funded, is subject to state regulations.

Table 13: Resources Analyzed for Induced Growth Impacts		
Resource	**Could the resource be indirectly impacted by potential induced growth?**	**Is this resource at risk?**
Air Quality	No. Any increased air pollutant or MSAT emissions resulting from the potential development or redevelopment of the area must meet regulatory emissions limits established by the TCEQ and the EPA. In addition, with cleaner fuels, improved emission technologies, alternative modes of transportation, and regional clean air initiatives, the air quality in the area should continue to improve over time.	No
Community Resources (Includes Businesses and Residences)	Yes; property values could be influenced by future development. Additional tax revenue would be generated by potential induced development.	No. Based on the analysis of impacts and benefits, the Oak Hill Parkway project would provide overall benefits to the socioeconomic resources in the project area. There are commercial activity centers, residential neighborhoods, and community facilities, such as emergency service providers, schools, places of worship and parklands within the Oak Hill Parkway corridor. The project would not change access to these resources; Rather, it would generally reduce congestion and improve mobility and travel time such that these resources are more easily accessible.
Neighborhoods	Changes to access and travel patterns could occur in neighborhoods within the AOI. Planning experts from the jurisdictions within the AOI do not expect the proposed project to influence the amount or rate of development within their jurisdictions, given the area's high rate of growth overall. No substantial impacts to neighborhoods resulting from induced growth associated with the proposed project are anticipated.	No

Table 13: Resources Analyzed for Induced Growth Impacts		
Resource	**Could the resource be indirectly impacted by potential induced growth?**	**Is this resource at risk?**
Limited English Proficiency	No. Adequate steps have been taken and are planned to assist the limited English proficiency population within the project area throughout the public involvement process for the proposed project.	No
Environmental Justice	Implementation of the 2040 planned transportation system would benefit the EJ population. The CAMPO 2040 Regional Transportation Plan (RTP) expands travel options by increasing transit service and adding more bicycle and pedestrian facilities.	No
Historic-Age Properties	No formal surveys have been conducted to date throughout the full extent of the areas of potential development. There appear to be a limited number of standing structures on these parcels, based on a review of aerial imagery.	Resources that are 50 years of age are potentially historic. NRHP-listed or eligible historic resources are protected by state and federal regulations for publicly funded projects. However, no state or federal regulations protect cultural resources for privately funded projects.
Archeological Resources	No formal surveys have been conducted to date throughout the full extent of the areas of potential development. Preliminary consultation of TxDOT-developed PALM maps indicates generally low to moderate potential for archeological impacts for these areas.	The Antiquities Code of Texas requires notification (to the Texas Historical Commission) if public agencies sponsor ground-disturbing activity on public land. NRHP-listed or -eligible archeological resources are protected by state and federal regulations for publicly funded projects. However, these state and federal regulations do not apply to privately funded projects.

Source: CMEC, 2018.

Note: Separate technical reports documenting the direct impacts of the proposed project have been or are being prepared for the resources listed in this table. Best available information was used during the preparation of this report to assess the impacts associated with potential induced growth.

4.5.3 Resources Analyzed for Induced Growth Impacts

Within the 10,192 acres available for development in the AOI, various resources could potentially be affected should development be proposed in the future by others. Based on the cartographic analysis and the information presented in **Table 13**, the following resources will be further analyzed for potential substantial indirect impacts from

project-related induced development: federally listed threatened and endangered species and surface water.

Because the exact type, location, timing, and density of future developments within the 10,192 acres identified as having development potential are unknown at this stage of project development, the following resource discussions are broad and are focused on potential construction impacts within regulation parameters.

Federally Listed Threatened and Endangered Species—Barton Springs Salamander and Austin Blind Salamander; Groundwater

The proposed project is partially located over the Recharge Zone of the Edwards Aquifer. The AOI for the proposed project is located primarily over the Contributing Zone of the Edwards Aquifer with portions of the AOI extending into the Recharge Zone and the Contributing Zone within the Transition Zone. **Figure 4** in **Attachment A** shows the extent of the Edwards Aquifer Contributing, Recharge, and Transition Zones with the AOI. Water quality degradation is identified as a threat to both the Austin blind salamander (USFWS, 2013) and the Barton Springs salamander (USFWS, 2005). Due to the nature of water and the way it travels, the indirect impacts analysis must consider whether the project could cause indirect impacts to water quality in areas some distance away from the project area, and whether impacts could occur later in time than accounted for in the direct impacts analysis.

No springs or caves are known to occur within the project area; any known locations of the Barton Springs salamander or Austin blind salamander are at a considerable distance from the project area. Therefore, direct impacts are extremely unlikely to occur. Although several new occurrences of the Barton Springs salamander have been documented in southern Travis and central Hays Counties within the AOI, none of these locations are within the Oak Hill Parkway Project area and all locations are noted outside the project's watersheds or upstream of the proposed *Preferred Alignment* (Devitt and Nissen, 2018). There are no known locations for the Austin blind salamanders within the AOI. However, based on the project-related increase in impervious cover, the project's location over the Recharge Zone of the Edwards Aquifer, and the known aquifer flow paths to Barton Springs from the impacted watersheds, this project may impact water quality through increased stormwater contribution. Therefore, this project may contribute to the downstream degradation of water quality parameters that are essential to the Barton Springs salamander and Austin blind salamander at discharge sites within the Barton Springs Complex.

Within the project area, Best Management Practices (BMPs) would be used during the construction and operation of the Oak Hill Parkway project to minimize and avoid direct and indirect impacts to water quality, and thus avoid impacts to the salamander

species that rely on the quantity and quality of groundwater in the aquifer. Engineered water quality protection features would be designed in accordance with the Edwards Aquifer Rules to offset the increase in impervious cover and any potential increase of roadway contaminants.

Once stormwater leaves the project area and infiltrates into the subsurface environment (e.g. groundwater), the flow path and amount of mixing with other subsurface waters are unknown. In the event of a BMP failure within the project area, any change in runoff water quality would be temporary and immeasurable due to the effects of dilution within the aquifer. Therefore, effects to the Barton Springs salamander and Austin blind salamander as a result of indirect water quality impacts are likely to be insignificant or discountable. Formal consultation with the USFWS occurred in December 2017. The USFWS concurred with TxDOT's determination that the proposed OHP Project would have an insignificant and discountable effect to federally listed species. Section 4.10.3.2 of the Final EIS includes additional detail regarding the results of USFWS consultation on this project.

The proposed project could allow access into previously inaccessible areas which could in turn result in new development. Based on the cartographic analysis discussed in **Section 4.5.1**, approximately 10,192 acres, or 12.0 percent of the AOI, consist of developable land (not including land where development is currently platted and/or planned).

Land disturbing activities such as grading, construction of bridges and culverts, drainage easement grading and shaping, and other construction activities for a project of this size would require coordination with the TCEQ. A Water Pollution Abatement Plan (WPAP) in compliance with the Edwards Aquifer Rules and a Stormwater Pollution Prevention Plan (SW3P) in compliance with Texas Pollutant Discharge Elimination System (TPDES) would be submitted for TCEQ review and approval. These documents specify the BMPs to be used to prevent erosion and sedimentation during construction, as well as post-construction Total Suspended Solids (TSS) controls. TCEQ's Edwards Aquifer Rules provide that affected cities, counties, and groundwater conservation districts may review and comment on the WPAP application when it is filed; thus, there will be a public participation opportunity at that time (30 TAC 213.4 (a) (2)).

All development within the Edwards Aquifer in the AOI is subject to the State's Edwards Aquifer Rules, the goal of which is non-degradation of existing groundwater quality (30 TAC 213.1). Moreover, a large portion of the AOI (17,923 acres) lies within the full or limited-purpose jurisdiction of the City of Austin, which has enacted water quality ordinances, further limiting development intensity.

In its final rule to list the Barton Springs salamander as endangered, USFWS acknowledges that "[g]enerally, new development and construction designed and implemented pursuant to State and local water quality protection regulations in effect as of the date of this rule will not result in a violation of section 9 [of the ESA] (USFWS, 1997a)." The EPA affirmed this finding when it approved Texas' application to administer National Pollutant Discharge Elimination System (NPDES).

In 2007, the TCEQ published a set of voluntary Optional Enhanced Measures (OEMs) as an appendix to their guidance document, *Complying with the Edwards Aquifer Rules: Technical Guidance on Best Management Practices* (TCEQ, 2005; TCEQ, 2007a). These measures provide a suite of options that can be used to enhance water quality by committing to construction, post-construction, and maintenance phase BMPs. According to the TCEQ's *Optional Enhanced Measures for the Protection of Water Quality in the Edwards Aquifer* Report (Revised) – Appendix A to RG-348 (TCEQ, 2005; TCEQ, 2007a) the USFWS concurred with the TCEQ's "no effect" determination for aquifer species for projects that adopt the OEM. Although this document does not address the Austin blind salamander, due to similarities in life history and habitat, it is assumed that the OEMs would be effective for this species as well.

Construction projects in the Edwards Aquifer Recharge Zone within the AOI would be subject to the Edwards Aquifer Rules and TPDES regulations. Assuming appropriate implementation of applicable land use planning regulations and local development ordinances and compliance with local, state, and federal laws and regulations, any substantial impacts to the quality and quantity of Edwards Aquifer recharge from development within the AOI would be avoided or minimized.

Surface Water

In general, effects on surface water quality can occur due to: (1) an increase in impervious surface area (which could result in increased runoff, altered recharge (flow and quality) into the aquifer, and decreased water quality downstream); and (2) grading and removal of vegetation during construction (which could accelerate erosion due to stormwater runoff).

The TCEQ's Total Maximum Daily Load (TMDL) Program works to improve water quality in impaired or threatened water bodies in Texas. A TMDL defines an environmental target by determining the extent to which a certain pollutant must be reduced. TMDLs are developed for surface waters that are impaired due to a pollutant or adverse condition. Based on the environmental target in the TMDL, the state develops an implementation plan to mitigate sources of pollution within the watershed and restore impaired uses. The Texas Water Quality Inventory and 303(d) List provide an overview of the status of surface waters of the state, including concerns for public health, fitness

for aquatic species and other wildlife, and specific pollutants and their possible sources. The 303(d) List, a subset of the inventory, identifies waters that do not attain one or more standards for their use.

There are no TCEQ-designated impaired streams within the project area, but stormwater runoff from the western end of the project area could enter Slaughter Creek, which has been identified by the TCEQ as an impaired assessment unit. During construction, exposed soil could runoff into streams and increase turbidity and sediment loading downstream.

Several regulations are relevant to the management of surface water quality and quantity throughout the AOI for this project. Sections 401 and 404 requirements under the CWA are generally applicable to public and private developments and would apply to the AOI for this project. Additional protections and permitting requirements apply to projects—such as Oak Hill Parkway and potential future developments—that are located over the Edwards Aquifer Recharge Zone. Local municipalities have their own regulations for local protection of water quality and quantity. Thus, indirect impacts from induced growth to surface water resources are not expected to be substantial.

4.6 Step 6—Identify Mitigation, If Applicable

Numerous mitigation measures are proposed to minimize and mitigate for potential impacts related to construction of the proposed project. **Section 8** in the Final EIS identifies mitigation and permitting (e.g. BMPs) that would be required for the implementation of the *Preferred Alternative*. In addition, a variety of land development requirements are in place at the municipal and county level that would also apply to any developer that proposed to build in the AOI. These are discussed by resource below.

4.6.1 Threatened and Endangered Species—Barton Springs Salamander and Austin Blind Salamander; Groundwater

The project would use BMPs that would allow for a TSS removal rate of at least 80 percent of the incremental increase in TSS load over the Recharge Zone. During construction, the BMPs would include erosion controls and sediment controls. The completed project would include facilities to collect and treat runoff prior to discharging it off site. The project would comply with the TCEQ's Edwards Aquifer Rules (including preparation of a WPAP) and would comply with the TPDES standards (through preparation of a SW3P).

Examples of BMPs that could be used during and following project construction include silt fences, temporary seeding, rock checks, erosion control blankets, and bioretention ponds, which are described in detail in the Draft EIS *(Biological Resources Technical*

Report) and **Section 8** of the Final EIS. A recent report by Dr. Michael Barrett (2016) focused on the effectiveness of various BMPs for stormwater runoff within the Barton Springs Zone. He concluded that, based on the water quality analysis of the constituents that are typically found in stormwater or highway runoff, the TCEQ and City of Austin BMP standards are effective at preventing degradation to water quality by matching or improving on background water quality parameters (Barrett 2016).

Projects moving forward as a result of induced growth from the proposed project would be subject to regulation under the ESA if it is anticipated that they would impact either the Barton Springs salamander or the Austin blind salamander or their habitat. The ESA defines "take" as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct" (ESA 1973). The Barton Springs salamander and the Austin blind salamander are not species listed for coverage under the BCCP. However, land set aside for the BCCP protects groundwater quality in the Barton Springs segment of the Edwards Aquifer, which indirectly benefits the salamanders. Furthermore, the City of Austin has set aside more than 26,000 acres of WQPLs specifically to protect the water quality within the Edwards Aquifer, which will also indirectly benefit and protect the Austin blind salamander and the Barton Springs salamander. These existing protections will help to mitigate future impacts to the listed salamander species.

4.6.2 Surface Water

Numerous regulations are in place to avoid or minimize impacts to water quality. The EPA's NPDES permit program, authorized by the CWA, controls water pollution by regulating point sources that discharge pollutants into waters of the U.S. In Texas, the NPDES program is administered by the TCEQ, as part of the TPDES. A NPDES permit may be required if wastewater is discharged into the stormwater system. The CWA established the basic structure for regulating discharges of pollutants into the waters of the U.S. The Municipal Separate Storm Sewer (MS4) program applies to cities and counties and is overseen by TCEQ. As MS4 operators, the City of Austin (COA, 2016a) and Travis County (Travis County, 2016c) developed Stormwater Management Programs, comprehensive long-range plans to prevent and reduce stormwater pollution.

Section 404 of the CWA gives the USACE authority to regulate the discharge of dredged or fill material into waters of the U.S., including wetlands. Impacts to waters of the U.S. and wetlands could require USACE authorization. Executive Order 11990 Protection of Wetlands (issued in 1977) requires federal agencies to minimize the destruction or modification of wetlands. Any future development project in the AOI would be required to comply with USACE regulations.

Floodplains are lowland areas adjacent to water bodies that are inundated during flood events. Construction within a floodplain reduces its capacity for floodwater storage and infiltration, as well as its value as habitat. Under Executive Order 11988 Floodplain Management, the FEMA requires municipalities that participate in the National Flood Insurance Program to adopt floodplain ordinances that prohibit development in existing 100-year floodplains. Coordination with the local floodplain administrator would be required for developments affecting floodplains.

A variety of regulations are in place to protect the quality of groundwater in the Barton Springs segment of the Edwards Aquifer, as discussed in previous sections.

The City of Austin also has regulations in place for voids and water flow features discovered during construction. According to §1.12.1 of the Environmental Criteria Manual, "all work must stop if a void in the rock substrate is discovered which is one square foot in total area, blows air from within the substrate, and/or consistently receives water during any rain event. At this time it is the responsibility of the Project Manager to immediately contact a City of Austin Environmental Inspector for further investigation." Development in the City of Austin would be required to comply with these standards.

TCEQ lists additional BMPs for construction and post-construction phases that future development projects would be required to consider, as discussed in the Draft EIS (Water Resources Technical Report) and **Section 8** of the Final EIS. The section also discusses other nontraditional types of BMPs that could be used to reduce runoff and potential pollutants.

4.6.3 Various Municipal Codes Including Land Development Regulations

City of Austin

The City of Austin has environmental protection considerations in the Land Development Portion of the Austin City Code for subdivision development (Title 25-8) including considerations of water quality, erosion, impervious cover, and handling of wastewater (COA, 2016b, 2016c, 2016d).

The City of Austin's Save Our Springs ordinance was adopted by popular vote in August 1992. The ordinance limits impervious cover and requires non-degradation levels of stormwater treatment for development of sites in the Barton Springs Zone (COA, 1992).

City of Bee Cave

Properties located within Bee Cave City Limits are subject to all city ordinances (City of Bee Cave, 2016b). Properties in the Bee Cave ETJ are subject to Non-Point Source

Pollution (water quality), Platting/Subdivision, and Signage regulations and nuisance control only. The Bee Cave Code includes development and subdivision regulations including policies for water quality protection.

City of Dripping Springs

Properties within the City of Dripping Springs and its ETJ are subject to the land use and development regulations (e.g., zoning and building codes) included in the Code of Ordinances for the City of Dripping Springs (City of Dripping Springs, 2016). Chapter 22 Article 5, also referred to as the water quality protection ordinance, establishes standards and procedures for controlling and managing nonpoint source pollution. The Dripping Springs water quality protection ordinance sets limits on impervious surface cover for developments for which a site development plan is first filed within the Edwards Aquifer recharge zone and the Edwards Aquifer contributing zone.

City of Sunset Valley

The City of Sunset Valley's Land Development Code, approved in September 2009, applies to all properties within the city limits of Sunset Valley and the Sunset Valley ETJ (City of Sunset Valley, 2011). The Land Development Code includes subdivision regulations and watershed development standards.

Village of Bear Creek

The Village of Bear Creek's Subdivision Ordinance regulates the subdivision of land within the Village of Bear Creek (Village of Bear Creek, 2016).

Travis County

The Travis County Code includes policies and procedures relating to construction standards in Chapter 80, which would make them subject to County Development Regulations. The County Development Regulations (Chapter 82) include provisions relating to the use and preservation of water resources as well as the amount of impervious cover allowable for projects within the county (Travis County, 2016d).

Hays County

The *Hays County Subdivision and Development Regulations* document contains environmental protection considerations (Hays County, 2013a). The *Hays County Subdivision and Development Regulations* (Article 1) also defers to the State of Texas Health and Safety Code, the Texas Water Code, and TCEQ to provide further guidance on environmental issues that may occur in Hays County. Further, Hays County is a voluntary member of the Hill Country Alliance, whose mission statement is "…to bring together an ever-expanding alliance of groups throughout a multi-county region…with

the long-term objective of preserving open spaces, water supply, water quality, and the unique character of the Texas Hill Country" (Hill Country Alliance, 2016).

5. Indirect Impacts Conclusions

This analysis consisted of a discussion regarding regulations and guidance, description of the scoping process and definition of the AOI, identification of areas subject to induced growth, identification of resources subject to induced growth impacts, and detailed analysis of those resources that are potentially at risk of being affected by induced-growth related impacts. The goals of the various communities in the AOI were discussed and trend data for population and housing development were provided. The detailed technical analysis of potential effects resulting from induced growth were presented based on cartographic analysis, technical analysis, and the results of an extensive planner questionnaire. Minimization and mitigation measures were discussed as they pertain to the resources at risk in the AOI, including environmental regulations and land use development regulations in place throughout the AOI.

Based on the limited amount of potentially developable land available in the AOI, comprehensive development regulations within the AOI, and the responses of local planning experts, the proposed project is not anticipated to generate substantial induced development. Factors such as the large amount of land protected from development and local regulations that limit impervious cover would constrain the amount of induced growth possible in the AOI. Several local planning experts maintain that development will continue to occur in the area regardless of whether the proposed project is constructed.

Induced growth could have some effect on water resources because induced development would result in increased impervious cover, which could in turn have an effect on water quality. However, the proposed project would not have a substantial adverse effect on water quality in the AOI because of the high percentage of managed areas and the implementation of regulations and BMPs.

Approximately 10,192 acres of undeveloped land within the AOI could be subject to development in the foreseeable future. Development projects that do occur within the planning horizons of the municipalities contacted (through 2040) would have to comply with the relevant land development code for projects within city limits and ETJ boundaries, where applicable. Areas outside municipal limits would be subject to state and federal laws.

Existing regulatory processes would provide controls to avoid potential adverse water quality related impacts to threatened or endangered species. Impacts to individuals or habitat of federally listed species are subject to federal regulations under the ESA of

1973. The City of Austin and Travis County's BCCP, in addition to the Hays County RHCP, are available to developers to facilitate compliance with the ESA in the AOI. In addition, the Save Our Springs ordinance limits impervious cover and requires non-degradation levels of stormwater treatment for development of sites in the Barton Springs Zone. Therefore, the effects to federally listed species resulting from induced development caused by the OHP Project is determined to be insignificant and discountable.

With regard to potential indirect effects on water quality resulting from potential development by others in the AOI, regulations are in place and applicable to proposed developments to minimize impacts to the resource. These include TCEQ regulations requiring preparation of SW3Ps and WPAPs, including use of BMPs in addition to the City of Austin drainage/water quality requirements. USACE Section 404 provisions of the CWA govern activities that would affect waters of the U.S. and wetlands, regardless of who proposes the development activity. Individual developers would be responsible for complying with these regulations.

The indirect effects that have been described in this section do not conflict with the various goals of planning and conservation entities in the AOI; are not expected to substantially worsen the condition of a sensitive resource; would not delay or interfere with habitat conservation planning efforts or species recovery efforts for sensitive species; would not eliminate a valued, unique, or vulnerable feature; and are not inconsistent with applicable laws. Therefore, additional mitigation is not proposed for the anticipated indirect induced-growth effects potentially caused by construction of the Oak Hill Parkway. Section 8 of the Final EIS identifies the mitigation and permitting associated with direct impacts that would be required for the implementation of the *Preferred Alternative*.

CUMULATIVE IMPACTS ANALYSIS

6. Introduction

Sections 7 through 10 of this technical addendum present the potential for cumulative impacts associated with the proposed Oak Hill Parkway project's *Preferred Alternative*. The analysis provides definitions of direct, indirect, and cumulative impacts and also summarizes the TxDOT guidance utilized to determine the magnitude of potential cumulative impacts.

7. Summary of Scoping Activities Completed

For the cumulative effects analysis, the scoping process is intended to focus the analysis on significant issues that will produce a meaningful cumulative effects study and factor into the environmental documentation decision. Scoping for the Oak Hill Parkway project, including cumulative effects, was conducted via the following methods:

- Regular coordination among the study team and the project's sponsors and stakeholders
- Agency stakeholder meetings
- Public involvement through public information meetings
- Information obtained from the indirect impacts questionnaire sent to local agencies and organizations (the questionnaire can be found in Attachment C)

The public and agency stakeholder meetings were used to introduce the project to the general public and agencies and to solicit comments and input on the project as it progressed. The public and agency stakeholder meetings that have been held to date are shown in Table 14.

All resources were considered with the same level of scrutiny in technical studies. From an agency standpoint, these meetings have documented that key resources for investigation of potential indirect and/or cumulative impacts are associated with water quality and aquifer-dependent species associated with the Barton Springs portion of the Edwards Aquifer. Past studies have been consulted and extensive data collection has taken place to ascertain connections between the proposed project and other actions in the context of the health of the particular resource. Particular attention has been paid to resources protected by legislation or resource management plans and ecologically important resources. These resources and issues are primary considerations in this section.

Table 14: Public and Agency Stakeholder Meetings	
Meeting Type	**Date**
Oak Hill Envisioning Mobility Workshop	8/29/2012
Public and Agency Scoping Meeting	11/15/2012
Technical Working Group Meeting	12/17/2012
Environmental Workgroup Meeting	1/31/2013
Design Workgroup Meeting	2/19/2013
Oak Hill Parkway EIS Work Session with City of Austin	3/1/2013
Oak Hill Parkway Bike/Pedestrian Workshop	3/19/2013
Oak Hill Parkway Design Concept Preview Meeting	5/16/2013
Oak Hill Parkway Public Open House	5/23/2013
Evaluation Workgroup Meeting	9/30/2013
Oak Hill Parkway Public Open House	10/22/2013
Finance Workshop	3/22/2014
Oak Hill Parkway Public Open House	6/17/2014
Stakeholder Workgroup Meeting	8/26/2014
Context Sensitive Solutions (CSS) Workshop #1	10/09/2014
Oak Hill Parkway Public Open House	1/20/2015
Bicycle and Pedestrian Workshop	2/17/2015
Oak Hill Parkway City of Austin Coordination Meeting	2/27/2015
Context Sensitive Solutions (CSS) Workshop #2	4/7/2015
Water Quality Workshop	8/25/2015
Oak Hill Parkway Public Open House	10/29/2015
Agency Meeting	12/14/2015
Stakeholder Meeting	4/13/2016
Informational Booths	4/23–4/24 and 4/30/2016
Stakeholder Meeting	6/8/2016
Environmental Workshop	6/23/2016
Project Update Workshop	5/23/2017
Project Update Workshop	7/25/2017

Source: CMEC, 2017.

8. Guidance

The Oak Hill Parkway EIS describes the proposed project and its potential direct effects on the environment. The CEQ defines direct effects as those effects that are "caused by the action and occur at the same time and place" (40 CFR § 1508.8). Direct effects are predictable and are a direct result of the project. In addition to direct effects, major transportation projects may also have indirect effects on land use and the environment. As defined by CEQ, indirect effects are "caused by an action and occur later in time or farther removed in distance, but are still reasonably foreseeable. The indirect impacts of the proposed project were assessed in **Section 4** of this addendum. This cumulative impacts analysis builds on the direct and indirect impacts analyses.

Cumulative effects are defined as effects "on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." (NEPA, 40 CFR § 1508.7).

The approach for conducting the cumulative impacts analysis for the Oak Hill Parkway project is ultimately guided by the following TxDOT publications, which are available online in the TxDOT Indirect and Cumulative Impacts Toolkit: *Risk Assessment for Cumulative Impacts* (TxDOT, 2014) and *Cumulative Impacts Analysis Guidelines* (TxDOT, 2016b). The TxDOT guidance references previous cumulative impacts analysis guidance issued by AASHTO while seeking "to provide a balance between a systematic methodology and scalable application" (TxDOT, 2016b).

Guidance regarding cumulative impacts analysis was published in 2011 and updated in 2016 by AASHTO. The AASHTO *Practitioners Handbook – 12 Assessing Indirect Effects and Cumulative Impacts under NEPA* (AASHTO, 2016) emphasizes the following key tasks:

(1) Describe Resource Conditions and Trends

(2) Summarize Effects of the Proposed Action on Key Resources

(3) Describe Other Actions and Their Effects on Key Resources

(4) Estimate Combined Effects on Key Resources

(5) Consider Minimization and Mitigation

Although AASHTO guidance helped inform this analysis, the TxDOT guidance (TxDOT, 2016b) dictated the steps followed in subsequent sections. The two documents include very similar information. It should be noted that guidance documents use different terms, including "cumulative impacts" (AASHTO, 2016) and "cumulative effects" (TxDOT, 2016b). For the purposes of this analysis, both terms are used and the meaning is the same.

9. Cumulative Impacts Analysis

As stated previously, cumulative impacts can result from "individually minor but collectively significant actions taking place over a period of time" (40 CFR § 1508.7, 1978). As this regulation suggests, the purpose of a cumulative impacts analysis is to view the direct and indirect impacts of the proposed project within the larger context

of past, present, and future activities that are independent of the proposed project, but which are likely to affect the same resources in the future.

In essence, a cumulative impacts evaluation first paints a conceptual picture of the existing or "baseline" condition of each resource, which is based on historical information and an assessment of the current condition of the resource. The analysis then inventories past, present, and reasonably foreseeable future projects in the vicinity that are planned and financed, but unrelated to the proposed project, and assesses the likely collective impacts of those projects for each resource. Analysis performed using GIS, aerial photography, and other data sources is typically engaged at this stage to quantify and assess past, present, and reasonably foreseeable development, in conjunction with the known indirect impacts related to the proposed project.

The analysis then describes the expected future status of the resource (i.e., in terms of quantity and condition) after the combined (i.e., cumulative) effects of the proposed project and other reasonably foreseeable projects are fully realized. Finally, the cumulative impacts analysis assesses the level of concern that should be associated with the expected cumulative impacts to a resource based on the scarcity or current condition of that resource. Relevant, reasonable mitigation measures must be identified, even if they are outside the jurisdiction of TxDOT, or are unlikely to be implemented. Mitigation measures identified to address the proposed project's direct and indirect effects can also minimize, rectify, or compensate for negative cumulative effects. These measures are typically considered and disclosed in other technical reports or environmental assessments.

The evaluation of cumulative impacts discussed in this document follows TxDOT's *Cumulative Impacts Analysis Guidelines* (TxDOT, 2016b). According to TxDOT's 2016 Guidance, the five steps of a cumulative effects analysis for a TxDOT project include:

(1) Resource study area, conditions, and trends;

(2) Direct and indirect effects on each resource from the proposed project;

(3) Other actions—past, present, and reasonably foreseeable—and their effect on each resource;

(4) The overall effects of the proposed project combined with other actions; and

(5) Mitigation of cumulative effects.

A screening table (**Table 15**) was prepared to summarize the direct and indirect impacts of the proposed project. This table was used to determine which resources warrant further study in the cumulative impacts analysis.

9.1 Step 1: Resource Study Area, Conditions, and Trends

9.1.1 Resources Analyzed for Cumulative Effects

According to TxDOT's Cumulative Impacts Analysis Guidelines (TxDOT, 2016b), if a project does not cause direct or indirect impacts on a resource, it will not contribute to a cumulative impact on that resource. **Table 15** describes direct and indirect impacts (including encroachment-alteration effects) for each resource category and indicates whether the resource is in poor or declining health or at risk. This analysis focuses on those resources substantially impacted by the project and those resources that are currently in poor or declining health or at risk, even if project impacts (either direct or indirect) are relatively small. The topics of greenhouse gas emissions and climate change will be addressed in a separate section of the EIS document. Land use is not assessed, but past, present, and reasonably foreseeable future projects are included in the analysis with reference to existing land use, transportation, and comprehensive plans that provide context for potential cumulative effects.

Table 15: Resources Analyzed for Cumulative Impacts Analysis					
Resource	**Direct Impacts**	**What encroachment-alteration effects are anticipated, if any?**	**Will the resource be indirectly impacted by potential induced growth?**	**Is the resource in poor or declining health?**	**Resource included in the cumulative effects analysis?**
Waters of the U.S., including Wetlands	The Oak Hill Parkway Project has the potential to impact 1 wetland, 11 streams, and 1 stock pond. Impacts to these waters would occur from extending existing culverts, placing fill for concrete aprons and/or rock rip rap at bridges, and placing temporary fills during construction. Exact fill types and amounts will be determined once design is finalized and, if necessary, would be permitted with a Nationwide Permit from the USACE. Mitigation for these impacts would also be determined, if necessary, and calculated based on amount and type of impact to each jurisdictional water.	Anticipated fill impacts to waters of the U.S., including wetlands, would generally be limited to the project footprint. Temporary and permanent impacts to waters of the U.S. are not expected to disrupt any natural processes in the project area. The construction of the *Preferred Alternative* would have limited encroachment-alteration effects because of the existing dense urbanization of the proposed project area and the incorporation of water quality best management practices.	Formal wetland delineations have not been conducted within all of the areas of potential development; however, if it was determined that the wetlands and waters are Waters of the U.S., then they would be protected by Section 404 of CWA (33 U.S.C. 1251 et. Seq, Section 404).	No. The USACE effectively regulates the discharge of dredged and fill material into waters of the U.S., including wetlands, under Section 404 of the CWA.	No
Floodplains	There are approximately 69.3 acres of FEMA-mapped floodplains within the *Preferred Alternative* alignment. Impacts to floodplains would be minimized by using BMPs during both construction and operation of the proposed project. The proposed project would span the ordinary high water mark (OHWM) of Williamson Creek. It is anticipated that bridge support structures (e.g., piers, abutments) could be designed to avoid causing an increase in the base flood elevation that would violate applicable floodplain regulations. Many of the other crossings are culverted and may require modification. Coordination with the local floodplain administrator would be required.	The proposed project would result in encroachment-alteration effects within a regulatory floodplain. The proposed project would increase impermeable surfaces and have the potential to indirectly affect sediment and pollutant loading in the flood hazard areas as mapped by FEMA. However, floodplain management regulations and design standards would require that the project be designed so as not to alter base flood elevations and not cause adverse flood impacts to upstream or downstream properties.	Approximately 1.3 percent of currently undeveloped land in the AOI (1,148 acres) is within the 100-year floodplain.	No. Future construction within the 100-year floodplain would be in compliance with appropriate permitting and general land use policies.	No

Table 15: Resources Analyzed for Cumulative Impacts Analysis

Resource	Direct Impacts	What encroachment-alteration effects are anticipated, if any?	Will the resource be indirectly impacted by potential induced growth?	Is the resource in poor or declining health?	Resource included in the cumulative effects analysis?
Water Quality – Surface Water and Groundwater	Construction-phase contamination would be prevented by adherence to environmental commitments such as BMPs outlined in the SW3P and Water Pollution and Abatement Plan. Post-construction TSS levels in treated stormwater would be lower than "background" loads of stormwater runoff from areas similar to the existing right-of-way through the use of stormwater detention ponds and vegetative filter strips. The proposed robust BMPs would also address other roadway-associated pollutants, such as heavy metals, nutrients, and hydrocarbons. During the operation phase, it is likely that new BMP implementation would result in an improvement to water quality leaving the project area through surface runoff or overland flow when compared to current conditions.	The construction of the Preferred Alternative would have limited encroachment-alteration effects to surface water quality due to the existing dense urbanization of the proposed project area and the incorporation of water quality best management practices. Encroachment-alteration effects to groundwater quality could occur primarily due to increased impervious cover or removal of vegetation that results in increased runoff and altered recharge (flow and quality) to the aquifer. Placement of the roadway could encroach on the surface or subsurface drainage areas of previously unknown adjacent caves/karst features, altering the hydrologic regimes in those features.	Future development within the AOI would cause an increase in impervious cover that could increase pollutants entering receiving waters during storm events. The Barton Springs segment of the Edwards Aquifer has unique hydrogeology that has produced a high-quality water source that is also vulnerable to contamination. The aquifer also provides habitat for karst and aquifer-dependent species that are sensitive due to their specific habitat needs. Groundwater quality could be impacted by stormwater-borne contaminants that could enter the Aquifer from induced development that could occur on approximately 10,192 acres of developable land in the AOI. The 569 acres (6 percent) of developable land in the AOI that are in the Edwards Aquifer Recharge Zone would have higher potential for contamination of groundwater, as well as the strictest requirements for complying with the Edwards Aquifer Rules for water quality protection.	Yes. Stormwater runoff from the western end of the project area could enter Slaughter Creek, which has been identified by the TCEQ as an impaired assessment unit. During construction, exposed soil could runoff into streams and increase turbidity and sediment loading downstream. The Barton Springs segment of the Edwards Aquifer is valuable because it supplies drinking water for approximately 60,000 people in Travis and Hays counties and provides habitat for a number of threatened or endangered aquatic species (Hunt et al., 2012b). The presence of anthropogenic contaminants and changes in physicochemical properties of aquifer water over the past few decades signify the potential effects of growing regional urbanization on aquifer water quality. Urbanization has been identified as one of the most significant sources of water quality degradation.	Yes
Federally Listed Threatened/Endangered Species	The Barton Springs salamander (*Eurycea sosorum*) and Austin blind salamander (*Eurycea waterlooensis*) are not known to occur within the limits of the project area. Both species have been recorded from spring outlets at Barton Springs in Zilker Park, approximately 2 miles northeast of the US 290/Mopac interchange. A recent range expansion for the Barton Springs salamander has been published, which documented new occurrences of this species in central Hays County. Although the Oak Hill Parkway project occurs partially within the South Travis County karst faunal region, the nearest record of occurrence for a listed karst invertebrate is located more than 2-miles north of the eastern project terminus. A Geologic Assessment was conducted for areas of the project which occur over the Recharge Zone of the Edwards Aquifer (HDR, 2018). Several sensitive	Encroachment-alteration effects could occur as a result of habitat loss due to increased development in the area, an increase in edge habitat, or an increase in impervious cover limiting recharge to the Edwards Aquifer. Both the Barton Springs and Austin blind salamanders are entirely dependent on the Edwards Aquifer. Changes to the aquifer as a result of decreased recharge or an increase in pollutants in stormwater runoff (stemming from increased impervious cover in the Recharge Zone) may affect, but is not likely to adversely affect, these species.	The USFWS Information for Planning and Conservation species list identifies a number of threatened or endangered species that could potentially be present within the AOI. The project is located within the Edwards Aquifer Recharge Zone and project runoff could contribute to water quality impacts downstream of the project location. Recharge from lower Williamson Creek has been documented by dye trace studies to flow to the Barton Springs complex, which is occupied habitat for the Barton Springs salamander and Austin blind salamander (BSEACD, 2014b).	Yes; however, the ESA affords protection for federally listed threatened and endangered species and their habitats. The USFWS maintains lists of potential occurrence for listed species in each Texas county. All development, whether public or privately funded, is subject to these federal regulations.	Yes

Table 15: Resources Analyzed for Cumulative Impacts Analysis

Resource	Direct Impacts	What encroachment-alteration effects are anticipated, if any?	Will the resource be indirectly impacted by potential induced growth?	Is the resource in poor or declining health?	Resource included in the cumulative effects analysis?
	recharge features were identified; however, no features exhibited habitat characteristics required for listed karst invertebrates. Several other federally listed species are known to occur in Travis County; however, no suitable habitat was identified during field investigation for species other than the salamanders and karst invertebrates, as discussed above.				
Vegetation and Wildlife (including state-listed species)	Impacts to vegetation and wildlife would be minimized through initial project design considerations and through the avoidance and minimization of vegetation removal. Construction activities would disturb only that which is necessary to construct the proposed project. The removal of native vegetation would be avoided to the greatest extent practicable and best management practices would be utilized to avoid impacts to migratory and nesting birds within the project area during construction activities. In response to public comments, landscaping enhancements such as tree plantings, tree relocation, and native seeding will be incorporated into the post-construction design as voluntary measures to offset the impacts of tree removal. No suitable habitat was identified during field investigation for any state-listed species that are not already federally listed. Suitable habitat was observed for 22 other SGCNs during field investigation. Required clearing or other construction-related activities may directly impact animals or plants that reside on or adjacent to the project right-of-way. Heavy machinery could kill small, low-mobility animals or could cause soil compaction, impacting animals that live underground.	Encroachment-alteration effects stemming from the proposed project could result in additional loss and fragmentation of vegetation and habitat types on developable lands within the study area. Development in general encroaches on vegetation, and reductions in vegetation typically equate to reduced wildlife habitat. For this project, however, impacts to habitat would be limited to the area of direct impact which is generally already developed and no encroachment-alteration effects are expected.	The areas of potential development are vegetated to varying degrees and provide wildlife habitat. The TPWD maintains lists of potential occurrence for listed species in each Texas county. The TPWD annotated list identifies a number of state-listed species that could potentially be present within the AOI.	No. State regulations prohibit harm to individuals of state-listed species. All development, whether public or privately funded, is subject to these state regulations. Although there is no regulatory protection for SGCNs or habitat, BMPs would be in place to minimize harm to individuals and removal of vegetation would minimized to the amount necessary for the proposed project. Approximately 50,000 acres of land within the City of Austin is protected from future development and would provide habitat for both state-listed species and SGCNs. This acreage includes Balcones Canyonlands Preserve and Water Quality Protection Lands.	No
Air Quality	The proposed project is consistent with the CAMPO 2040 RTP and the 2017-2020 Transportation Improvement Program (TIP). Local concentrations of carbon monoxide are not expected to exceed national standards at any time. Under the *Preferred Alternative*, emissions of total MSAT are predicted to decrease by 70 percent from 2015 to 2040.	Encroachment-alteration effects were evaluated in the traffic air quality analysis and quantitative MSAT analysis.	No induced growth impacts to air quality are anticipated.	No; the proposed project is located in Travis County, which is designated as attainment or unclassified for all National Ambient Air Quality Standards (NAAQS). The proposed project is not subject to transportation conformity.	No

Table 15: Resources Analyzed for Cumulative Impacts Analysis

Resource	Direct Impacts	What encroachment-alteration effects are anticipated, if any?	Will the resource be indirectly impacted by potential induced growth?	Is the resource in poor or declining health?	Resource included in the cumulative effects analysis?
Community Resources (includes businesses and residences)	The proposed project is expected to result in one residential and two business displacements due to right-of-way acquisition, and two business displacements due to removal of access. Additional right-of-way would be needed from 80 parcels. The majority of property acquisitions associated with the Oak Hill Parkway project would allow the remaining portions of the impacted parcels to continue to function as they currently do. Noise analyses have indicated that noise impacts would result from the proposed project; proposed noise abatement in the form of proposed noise barriers have been identified for the proposed project.	Some businesses may be affected that are currently utilizing TxDOT's existing right-of-way for parking and access. The elimination of access and available parking may cause the eventual loss of business in these locations.	Yes; property values could be influenced by future development. Additional tax revenue would be generated by potential induced development.	No; direct impacts are limited, plus the large number of community resources located within the project area were not documented to be in poor or declining health in the community impacts assessment technical report.	No
Neighborhoods	The proposed project would add capacity to the existing facility. The proposed project would not serve to divide any of the existing neighborhoods or further divide the community. Access to some portions of the facility may change with implementation of the proposed project; however, the construction would be expected to reduce travel times for commuters within the adjacent neighborhoods and reduce cut-through traffic along local roadways.	Reduced congestion and improved conditions on US 290 and SH 71 would likely make neighborhoods along this corridor beyond adjacent properties more desirable and could have the effect of increasing property values. Note that many other factors in addition to transportation mobility contribute to a property's value. The proposed project is not expected to result in adverse encroachment-alteration effects on neighborhoods and communities.	It is likely that new neighborhoods will continue to be developed along the corridor and out to points west and north of the Oak Hill Parkway corridor, regardless of whether or not the improvements are constructed. Changes to access and travel patterns could occur in neighborhoods within the AOI. Planning experts from the jurisdictions within the AOI do not expect the proposed project to influence the amount or rate of development within their jurisdictions, given the area's existing high rate of growth. No substantial impacts to neighborhoods resulting from induced growth associated with the proposed project are anticipated.	No; the many organized neighborhoods located within the project area are not considered to be in poor or declining health according to the community impacts assessment technical report.	No
Environmental Justice (EJ)	The two businesses and one residence that could potentially be displaced, in addition to two business displacements due to removal of access, are not located in an EJ area. As the proposed improvements would not bisect existing neighborhoods, and would generally occur near the existing roadway, community cohesion impacts would not be expected. The main impacts to EJ populations would occur during construction and would not be disproportionately high and adverse. The EJ population would realize the benefits of the additional travel lanes, shared-use paths and sidewalks – all of which are components of the proposed project. Capital Metro buses	No encroachment-alteration effects would be expected as the proposed project would not change access to or create a barrier within the project corridor. Encroachment-alteration effects would not be expected on other socioeconomic resources in the project area including neighborhoods and communities, employment and economic activity, or public facilities that could subject EJ communities to disproportionately high and adverse effects.	The CAMPO uses demographic data compiled by traffic analysis zones (TAZ) to identify EJ areas throughout their six-county planning area (which encompasses the AOI of the proposed project). There are no CAMPO-identified EJ areas within the AOI of the proposed project.	Yes; EJ populations are comprised of vulnerable populations, including minorities and low-income persons. EJ is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means no group of people should bear a disproportionate share of the negative environmental consequences resulting from the proposed improvements. Executive Order 12898 and Title VI provide protections for environmental	No

Table 15: Resources Analyzed for Cumulative Impacts Analysis

Resource	Direct Impacts	What encroachment-alteration effects are anticipated, if any?	Will the resource be indirectly impacted by potential induced growth?	Is the resource in poor or declining health?	Resource included in the cumulative effects analysis?
	would be able to travel on the Oak Hill Parkway, enabling more reliable transit in the US 290 corridor for all transit riders (EJ and non-EJ). The proposed project would benefit EJ and non-EJ populations alike, increasing mobility within the project limits for drivers and transit users.			justice populations that have been historically vulnerable to environmental and health hazards resulting from public programs, policies, and activities. Data collected for the community impacts assessment technical report indicated the presence of EJ populations is low for the proposed project's Census profile areas.	
Historic-Age Properties	Three historic-age resources and one historic district within the Area of Potential Effects (APE) were determined eligible for NRHP listing. The proposed project would have no direct effects and no adverse indirect effects on any of the NRHP-eligible resources and historic district.	No encroachment-alteration effects are anticipated as a result of the proposed project.	No formal surveys have been conducted to date throughout the full extent of the areas of potential development. There appear to be a limited number of standing structures on these relatively undeveloped parcels, based on a review of aerial imagery.	Resources that are 50 years of age or older are considered historic-age. NRHP listed or eligible historic resources are protected by State and Federal regulations for publicly funded projects. However, no State or Federal regulations protect cultural resources for privately-funded projects.	No
Archeological Resources	Four archeological sites are within the proposed project's APE. These sites have either not been recommended for State Antiquities Landmark (SAL)/NRHP designation or have been declared ineligible for SAL/NRHP designation.	No encroachment-alteration effects are anticipated as a result of the proposed project.	No formal surveys have been conducted to date throughout the full extent of the areas of potential development. Preliminary consultation with TxDOT-developed PALM indicates generally low to moderate potential for archeological impacts for these areas.	The Antiquities Code of Texas requires notification (to the Texas Historical Commission) if public agencies sponsor ground-disturbing activity on public land. NRHP-listed or eligible archeological resources are protected by state and federal regulations (Section 106 of the National Historic Preservation Act) for publicly-funded projects. However, these state and federal regulations do not apply to privately-funded projects.	No

Source: CMEC, 2018.

As shown in **Table 15**, the resources/issues for which the proposed project may potentially have cumulative impacts are water quality (surface water and groundwater) and federally listed threatened/ endangered species for which more information is provided below.

9.1.2 Resource Study Areas, Current Conditions, and Trends

Cumulative effects are considered within a spatial geographic area referred to as a Resource Study Area (RSA). For each resource evaluated in the cumulative effects analysis, an RSA appropriate to that resource has been established using the criteria in TxDOT's *Cumulative Impacts Analysis Guidelines* (TxDOT, 2016b) and relevant studies (TxDOT, 2015).

Federally Listed Threatened and Endangered Species—Barton Springs Salamander and Austin Blind Salamander

Resource Study Area

Water quality degradation is identified as a threat to both the Austin blind salamander and the Barton Springs salamander (USFWS, 2013). The geographic RSA for cumulative impacts to the Austin blind salamander and the Barton Springs salamander is considered to be the area of the Barton Springs segment of the Edwards Aquifer which provides the subterranean habitat and feeds the spring habitat that both species occupy. The RSA encompasses approximately 258,039 acres. The southern boundary of the RSA represents the groundwater divide between the Barton Springs segment of the Edwards Aquifer and the San Antonio segment (**Figure 2** in **Attachment D**). The northern boundary of the RSA represents the northern boundary of the Barton Springs segment and the TCEQ Contributing Zone of the Edwards Aquifer. This area is located in Travis and Hays counties and includes areas of the Edwards Aquifer Contributing Zone, Recharge Zone, Transition Zone, and Contributing Zone within the Transition Zone.

The temporal RSA for cumulative impacts to these two salamander species is considered to be 1978 through 2040. 1978 is the year the Barton Springs salamander, the first endangered salamander species identified in the Barton Springs segment of the Edwards Aquifer, was recognized as a distinct species from other central Texas salamander species. 2040 is the horizon year of CAMPO's current long-range transportation plan.

Current Conditions

Until recently, both the Barton Springs and the Austin blind salamander were presumed to be endemic to the Barton Springs Complex; however, recent genetic analysis of salamanders collected at several locations in southwestern Travis County

and northern Hays County that discharge water to the Barton Springs Segment of the Edwards Aquifer suggest otherwise (Chippendale, 2014; Devitt and Nissen, 2018). Of the four collection sites discussed by Chippendale (2014), two locations (Cold Springs and Blowing Sink Cave) are indirectly associated with the OHP Project area. Cold Springs is notable because the OHP Project area is partially located within the Cold Springs groundwater basin as mapped by Hauwert (2015), and his dye trace studies have shown flow paths linking Williamson Creek to this location during high flow events (Hauwert, 2009, 2015). Similarly, Blowing Sink Cave is located approximately 3.8 miles south of the MoPac/US 290 interchange, and flow paths to Barton Springs have been mapped from this location (Hauwert, 2009). Blowing Sink cave is located within the Slaughter Creek watershed, and stormwater runoff leaving the west end of the OHP Project area and draining into Devil's Pen Creek may contribute to recharge in this area. Additionally, in 2015, a single Barton Springs salamander was identified from a sampling well on FM 1626, approximately 9.5 miles south of the Barton Springs Complex (Texas Natural Diversity Database, 2016). In 2018, seven new occurrence records of the Barton Springs salamander were documented, which confirmed a significant range expansion for this species (Devitt and Nissen, 2018). Four of the new locations (Onion Creek drainage) were documented southwest of the OHP Project area and discharge from the Contributing Zone of the Edwards Aquifer (Devitt and Nissen, 2018). The remaining locations were from the Recharge Zone, one from Little Bear Creek, one from Bear Creek, and the last from Barton Creek. The Barton Creek location (Backdoor Spring) is located approximately 1.68 miles north of the MoPac/US 290/SH 71 interchange and would be considered upstream of the OHP Project area. As discussed by Devitt and Nissen (2018), the range extension of the Barton Springs salamander documented from the Onion Creek drainage in the Contributing Zone challenges the historical interpretation that the Edwards and Trinity aquifers are distinct hydrogeologic units. Although the majority of the OHP Project occurs within the Contributing Zone, no Barton Springs salamanders have been documented from the Barton Creek watershed in the northern section of this zone. Cumulative impacts to these species will be considered within the context of the geographic RSA.

Urbanization and declines in water quality and quantity in the aquifer are cited by the USFWS as the primary threats to the species (USFWS, 2013). Water quality is influenced by an assortment of parameters, such as amount of impervious cover, TSS, total organic carbon, dissolved pollutants (such as heavy metals and petroleum hydrocarbons), nutrients, dissolved oxygen, and chemicals such as pesticides and herbicides. All of these have been identified by the USFWS as factors that influence the survival of aquifer-dependent salamanders. There has been substantial urbanization and development over the Barton Springs Zones since the listing of the Barton Springs salamander in 1997. A recent study estimated an almost 1,400-acre

increase in impervious cover for the Williamson Creek watershed from 1991 to 2008 (Sung et al., 2013; Barrett, 2016). It is widely accepted that an increase in impervious cover can generate an increased volume and velocity of stormwater runoff, which can have a detrimental effect on water resources if not properly controlled. Stormwater runoff can negatively affect water quality when it contains urban pollutants such as those constituents associated with highway runoff (e.g. TSS, zinc, and other heavy metals) (Sung et al., 2013; Barrett, 2016).

Barton Springs salamander populations seem to fluctuate around an equilibrium level in response to drought and flood periods and experience density-dependent population growth, which is a positive indicator of population viability (Bendik and Turner, 2011).

A study by Gillespie states that the Barton Springs salamander

> "employs a 'storage effect' type life history strategy in which a few long-lived females capable of sperm storage, high fecundity, and prolonged survival in subterranean habitat during adverse surface conditions may be sufficient to sustain population sizes observed in this study. In addition, oviposition [the process of laying eggs] may be triggered by low flow conditions followed by bouts of high rainfall which drives water temperature down, and juveniles may use subterranean habitat as a thermal refuge for growth and development. As climate change threatens to increase climatic variability in central Texas, analysis of population trends as more data is collected will be crucial for determining how (the Barton Springs salamander) responds to such changes in the coming years (Gillespie, 2011)."

Monthly surveys for the Barton Springs salamanders began at Barton Springs in 1993. Starting in 1998, surveys were also conducted for the Austin blind salamander. Based on the data presented in the City of Austin's amended Habitat Conservation Plan, it appears that the two species' populations have been fluctuating around equilibrium levels (COA, 2013a).

Trends

Regulatory History

The Barton Springs salamander was listed as a federally endangered species on April 30, 1997. The Austin blind salamander was listed as a federally endangered species on September 19, 2013. No specific critical habitat was defined for the Barton Springs salamander (USFWS, 1997b). Approximately 120 acres of critical habitat has been

designated for the Austin blind salamander (USFWS, 2013) as shown in **Figure 2** in **Attachment D**.

A recovery plan for the Barton Springs salamander was published in September 2005. The plan established recovery and delisting criteria for the species, which included:

1) Protecting the Barton Springs watershed (the above and belowground limits of which are encompassed by the RSA) in order to maintain adequate water quality

2) Developing a plan to respond to spills of hazardous materials within the Barton Springs watershed

3) Implementing a management plan for the Barton Springs watershed

4) Establishing a captive breeding program for the Barton Springs salamander (USFWS, 2005)

In January 2016, the 2005 Barton Springs Salamander Recovery Plan was amended to include the Austin Blind salamander. According to the USFWS, the greatest threat to the survival of the Austin blind salamander as a species is degradation of habitat through the decline of water quality and quantity in the Edwards Aquifer (USFWS, 2013).

The Barton Springs/Edwards Aquifer Conservation District (BSEACD) published a Draft Habitat Conservation Plan (HCP) and Preliminary Draft EIS (PDEIS) that addressed both the Barton Springs salamander and the Austin blind salamander (BSEACD, 2007). The purpose of the Draft HCP was to protect and conserve the two species of salamanders and their habitat associated with the Barton Springs/Edwards Aquifer system so that the USFWS could issue a permit for the incidental take of both species related to human utilization of the Barton Springs segment of the Edwards Aquifer. The purpose of the PDEIS was to evaluate three groundwater management alternatives and their impacts on the two salamander species and their habitats. The Draft HCP and PDEIS were submitted to USFWS in August of 2007. USFWS returned comments on the Draft HCP in November of 2008. In 2014, the BSEACD Board approved the final Draft HCP and submitted the permit application to USFWS for the District's groundwater management plan (BSEACD, 2014b). As of February 2017, final approval from USFWS is pending.

The City of Austin salamander biologists revised and expanded Austin's HCP for Barton Springs in July 2013 after a two-year process involving citizen input and extensive coordination with the USFWS. The current incidental take permit from the USFWS was issued in September 2013 and will expire in 2033 (COA, 2013a, 2017a). This permit allows for the incidental take of both species at Barton Springs in order to maintain

the pools of the Barton Springs complex for ecological, conservation, and recreational purposes. Several habitat enhancement/reconstruction projects are described in the HCP to reverse anthropogenic habitat modifications within the Barton Springs complex that have resulted in loss and fragmentation of surface habitat within the springs. Under the HCP, Eliza Springs and Old Mill Springs will remain fenced off and closed to the public to protect the salamander habitat at both sites. Parthenia Springs (Barton Springs Pool) and Upper Barton Springs will both remain open to the public. Disturbance to salamanders from recreational use of Parthenia Springs and Upper Barton Springs is thought to be short term and minimal, affecting individual salamanders as opposed to the entire population (COA, 2013a).

In addition to the protections listed above for the salamanders, there are several federal, state, and municipal-level protections in place for surface and groundwater quality and quantity that may provide indirect protection to both species of salamander by protecting water quality. Examples of these measures include acquisition by the City of Austin of approximately 29,825 acres of WQPLs, 27,739 of which fall within the RSA, and 20,164 acres of BCP properties; 4,508 acres of which fall within the RSA. Both of these measures serve to protect groundwater quality in the Edwards Aquifer and, by extension, Barton Springs.

Barton Springs Salamander

The Barton Springs salamander was first collected from Barton Springs Pool (i.e., Parthenia Spring) in 1946. However, it was not recognized as a distinct species until 1978 when Dr. Samuel Sweet published a paper differentiating the Barton Springs salamander from other central Texas salamander species based on its restricted distribution and unique morphological and skeletal characteristics. The species was formally described in 1993 with an adult male collected from Barton Springs Pool in 1992 used as the holotype (USFWS, 1997b).

The Barton Springs salamander was described as occurring in the “dozens or hundreds” among sunken leaves in Eliza Pool when it was described in the 1970s (USFWS, 1997b). However, formal collection of population data for this species began in 1993 when the City of Austin began conducting salamander abundance and density surveys (COA, 2013a). Monthly surveys began in Parthenia Spring in 1993, followed by additional monthly surveys in Eliza and Old Mill Springs in 1995 and monthly surveys in Upper Barton Spring beginning in 1997. Abundance of the Barton Springs salamander has varied on a site-specific basis from zero to 1,234 salamanders with densities ranging from zero to 1.5 per square foot. The highest abundance of salamanders in the perennial spring sites occurred from April to June of 2008. Analysis of data from Parthenia and Eliza springs from 2004 to 2011 by the City of Austin does

not indicate any significant increase or decrease in the population size of the Barton Springs salamander at these two sites.

This suggests that the population in each spring fluctuated slightly around average sizes during this time period. While this data is encouraging and suggests that Barton Springs salamanders have the potential to persist, the analysis is based on 61 and 71 data points from Parthenia and Eliza Springs, respectively, over a seven-year period. The small amount of data over a relatively short period of time may not provide for a robust enough analysis to determine the long-term viability of this species at these two sites (COA, 2013a).

Because the species is neotenic and spends its entire life in the water, the Barton Springs salamander is highly dependent on the water quality of the Barton Springs segment of the Edwards Aquifer which feeds Barton Springs. There have been past instances when water quality has negatively impacted Barton Springs salamanders. Within a six-month period in 2002, 17 Barton Springs salamanders were found in Upper Barton Springs and two at Sunken Garden Springs with bubbles of gas occurring throughout their bodies. Three more salamanders were found in February and March of 2003 in Upper Barton Springs with bubbles of gas in their bodies. This condition is referred to as "gas bubble trauma" and is a condition in which bubbles below the surface of the body and inside the cardiovascular system produce lesions and necrotic tissue that can lead to secondary infections. It is believed that this condition is caused by supersaturated water, or water that has dissolved atmospheric gasses in concentrations greater than 100 percent. Supersaturation is when a solution, in this case water, contains more of a dissolved material than would normally be possible under normal conditions. An example of this would be carbonated water, which is a supersaturation of water with carbon dioxide gas. During the time when affected salamanders were found in the Barton Springs complex, supersaturation percentages were above 110 percent at all four of the springs. Of the 19 salamanders that were found to be afflicted by the condition in 2002, 12 died. Some evidence suggests that pollutants found in stormwater runoff entering the aquifer from urban areas could adversely affect an organism's tolerance for supersaturated conditions, making them more susceptible to illness and death (USFWS, 2005).

The contamination of Parthenia Springs by the improper use of chlorine to clean the pool in 1992 resulted in a fish kill within the spring. Though no dead salamanders were found as a result of the chlorine contamination, only 10 to 15 salamanders were observed in a subsequent survey; the observed salamanders were all located within a 5-square-meter (54-square-foot) radius around the outflow of Parthenia Springs (USFWS, 1997b). This was a relatively low survey result for the population of salamanders in Parthenia Springs.

The Edwards Aquifer is one of the most permeable and productive limestone aquifers in the United States (EAA, 2016). The aquifer is especially susceptible to contamination due to its karst topography, which facilitates rapid transmittal of potential contaminants over long distances once in the limestone aquifer (Small et al., 1996).

Studies have shown that impervious cover within a watershed should generally not exceed 15 percent to prevent damage to the watershed and aquatic ecosystems therein (CRWR, 1995). For sensitive watersheds, there should be an impervious cover percentage of no greater than 10 percent to prevent damage to sensitive stream ecosystems (USFWS, 2005). Approximately 85 percent of recharge to the Edwards Aquifer comes from six streams located within the Recharge Zone (Slade et al., 1986). Of these, Williamson Creek, its tributaries, and Devil's Pen Creek (a tributary to Slaughter Creek) occur within the Oak Hill Parkway project area. Recharge from lower Williamson Creek has been documented by dye trace studies to flow to the Barton Springs complex (BSEACD, 2017a; Smith et al., 2005). The largest and most stable populations of Barton Springs salamanders are within Parthenia Springs and Eliza Springs. As of 2000, impervious cover percentages in the watersheds within the study area were as follows:

- Williamson Creek: 16 percent
- Slaughter Creek: 7 percent
- Barton Creel: 6 percent (USFWS, 2005)

A review of impervious cover was completed by Blanton & Associates in 2014 based on 2012 imagery source from the United States Department of Agriculture (USDA) National Agricultural Imagery Program (NAIP). The impervious cover data was updated in 2017 by Cox|McLain Environmental Consulting (CMEC) based on 2016 aerial Google Earth imagery. Impervious cover percentages on the watersheds within the study area were as follows:

- Williamson: 32 percent
- Slaughter Creek: 20 percent
- Barton Creek: 9 percent

Continued development of impervious cover within watersheds that provide recharge to the portions of the aquifer that sustain salamander habitat within the Barton Springs complex could have a negative impact on the Barton Springs salamander.

A recent report by Barrett (2016) evaluated the results of over 20 years of water quality data, including roadway runoff constituents (TSS and zinc), at Barton Springs. Barrett's

report also examined the effectiveness of typical BMPs that are frequently used to treat stormwater runoff under City of Austin regulations and the TCEQ Edwards Aquifer Rules. He concluded that these BMPs are successful at removing pollutants from highway runoff, and cited the findings of historical water quality data collected by the City of Austin and the U.S. Geological Service (USGS) at Barton Springs. Of particular importance to highway runoff are TSS, zinc, and copper, all of which have been stable or decreasing at Barton Springs over the last 20 years despite the increased urbanization over the Barton Springs Zone (Barrett, 2016).

Austin Blind Salamander

The Austin blind salamander was not recognized as a distinct species from the Barton Springs salamander until 1998. Therefore, information regarding this species is more limited than information for the Barton Springs salamander (COA, 2013a). It was officially described in 2001 (USFWS, 2013).

In May 2004, the USFWS received a petition to list the Austin blind salamander (along with 224 other species) under the ESA. In August 2012, the USFWS published a proposed rule to list the Austin blind salamander as endangered. The Austin blind salamander was listed as endangered in September of 2013 (USFWS, 2013).

Population trends for Austin blind salamanders are difficult to track as the species is believed to primarily reside in subterranean habitat within the aquifer. Furthermore, as this species was only recently identified, there are few studies focusing on this species. However, the City of Austin has included the species in its monthly abundance and density surveys of salamanders at the Barton Springs complex since 1998. The Austin blind salamander has been found in three of the four springs in the Barton Springs complex, but has not been observed in Upper Barton Springs. Typically, anywhere from 6 to 12 Austin blind salamanders are observed per site, per year for a total of 530 different observations for all sites between 1998 and 2010 (COA, 2013a). Further analysis of the data is difficult as it occurs over a limited period of time with a relatively small number of observations. It is unclear at this time whether there are any significant population trends for this species. However, according to one study, the Barton Springs salamander may have a “storage effect” life history strategy in which a few long-lived females capable of sperm storage, high fecundity, and prolonged survival in subterranean habitat during adverse surface conditions may be sufficient to sustain viable population sizes (Gillespie, 2011). Therefore, it may be possible that the Austin blind salamander has a cyclical population size that can decrease dramatically in times of stress then rebound from the few remaining individuals when conditions improve.

As with the Barton Springs salamander, the Austin blind salamander is neotenic and spends the entirety of its life within the water of Barton Springs or the Edwards Aquifer. It is therefore highly dependent on the water quality of the aquifer. However, unlike the Barton Springs salamander, the Austin blind salamander has never been observed to be affected by gas bubble trauma (USFWS, 2005). The species had not yet been identified in 1992 when an accidental chlorine contamination of Parthenia Springs led to an apparent decline in the number of Barton Springs salamanders observed immediately following the incident (USFWS, 1997b); therefore, it is unknown if this species was similarly affected.

The Austin blind salamander is only known to occur in Barton Springs. As discussed in the Barton Springs salamander trends section above, groundwater recharge from lower Williamson Creek has been documented by dye trace studies to flow to the Barton Springs complex (BSEACD, 2017a; Smith et al., 2005). It is therefore likely that impacts to groundwater quality in the study area could have the same potential to impact the Austin blind salamander as they would the Barton Springs salamander (COA, 2013a; USFWS, 2005).

Groundwater

Resource Study Area

The geographic RSA for cumulative impacts to groundwater associated with the proposed project is considered to be the area of the Barton Springs segment of the Edwards Aquifer that is regulated by the TCEQ or the BSEACD. The RSA encompasses approximately 258,039 acres. The southern boundary of the RSA represents the groundwater divide between the Barton Springs and the San Antonio segments of the Edwards Aquifer (**Figure 3** in **Attachment D**). The northern boundary of the RSA represents the northern boundary of the Barton Springs segment and the TCEQ Contributing Zone of the Edwards Aquifer. This area is located in Travis and Hays counties and includes areas of the Edwards Aquifer Contributing Zone, Recharge Zone, Transition Zone, and Contributing Zone within the Transition Zone.

The temporal RSA for groundwater begins with 1970, which is the year that Edwards Aquifer water quality regulations took effect. The temporal RSA for groundwater extends through 2040 (the horizon year of CAMPO's current long-range transportation plan).

Current Conditions

The Edwards Aquifer is one of the major aquifer systems in Texas, and the Barton Springs segment serves as either a sole source or a primary source of drinking water for approximately 60,000 people in Travis and Hays counties (Hunt et al., 2012b). The unique hydrogeology of the aquifer has produced a water source that is high quality,

but also vulnerable to contamination. In addition, the aquifer provides habitat for a number of threatened or endangered aquatic and karst species, including the Barton Springs salamander and the Austin blind salamander.

Within the Barton Springs segment of the Edwards Aquifer, four distinct zones are present: Contributing Zone, Recharge Zone, Transition Zone, and Contributing Zone within the Transition Zone. Surface water quality is an important factor that can influence groundwater quality in this area. Surface water quality is addressed in **Section 9.1.2.3** of this report**.** The watersheds in the study area have been traced to multiple groundwater flow paths, including Cold Springs, Slaughter and the Manchaca flow routes. These flow routes have been linked to discharge at Cold Springs, and Main, Eliza, and Old Mill Springs of the Barton Springs complex (BSEACD, 2014b). Barton Springs in south Austin is the most well-known outlet of the Barton Springs segment of the Edwards Aquifer. Water quality at the springs is of interest for two reasons: the springs system supplies a 750-footlong swimming pool visited by more than 450,000 people each year (COA, 2009), and provides habitat for the Barton Springs salamander and Austin blind salamander. Barton Springs is located approximately 4 miles northeast of the study area.

Within the Barton Springs segment of the Edwards Aquifer, the City of Austin owns or controls over 27,700 acres that are designated WQPLs (COA, 2017a; Thuesen, 2013). These lands were purchased using funds from two utility bonds approved in 1998 and are managed to provide optimal water yield and to protect both water quality and quantity recharging in these areas (Lady Bird Johnson Wildflower Center [LBJWC], 2010). The WQPLs are located within the Barton Springs segment Recharge and Contributing Zones; currently over 23 percent of the Recharge Zone and over 7 percent of the Contributing Zone within the Barton Springs segment of the Edwards Aquifer are protected through the WQPL program (Thuesen, 2013).

Approximately 4,500 acres of land within the groundwater RSA are designated for protection as a part of the BCP. The BCP is set aside for endangered species habitat as required in the BCCP, a habitat conservation plan developed by the City of Austin, the Lower Colorado River Authority (LCRA) and Travis County for the acquisition of a regional permit allowing incidental take of covered species. Species covered under the BCCP include the Golden-cheeked Warbler, Black-capped Vireo, and six endangered karst invertebrates (Tooth Cave pseudoscorpion, Tooth Cave spider, Bee Creek harvestman, Bone Cave harvestman, Tooth Cave ground beetle, and Kretschmarr Cave mold beetle). The preserve is also designed to protect 27 species of concern, including 25 karst invertebrates and 2 plants. The preservation of BCP lands positively influences water quality because the land is protected from development or degradation.

Trends

Regulatory History

Due to the importance of the Edwards Aquifer as a water source for a growing population, various regulations have been established to conserve water supply and protect water quality within this resource. Historically, the framework for groundwater rights in Texas has been the common law "Rule of Capture." Groundwater was not legislated in Texas until the passage of the Texas Underground Water Conservation Act in 1949, which allowed for the establishment of groundwater conservation districts (Brown, 2006; TCEQ, 2017).

In 1959, the Edwards Underground Water District was formed to supply maps and to assist licensing authorities. The first regulations for protecting the quality of water in the Edwards Aquifer were not issued until 1970 (TCEQ, 2017). These rules regulated development, including underground storage tanks, aboveground storage tanks, and sewer lines, over portions of the aquifer in Kinney, Uvalde, Medina, Bexar, Comal, and Hays counties (TCEQ, 2017). Throughout the 1970s and 1980s, additional water quality regulations were established, including requirements for water quality protection measures (30 TAC Chapter 213) which would lead to the establishment of, and requirements for WPAPs and geologic assessments, and the introduction of fees for reviews and inspections (TCEQ, 2017). Construction activities in portions of Williamson County were first regulated in 1986; construction in portions of Travis County became regulated in 1990 (TCEQ, 2017).

Groundwater water quality protections were codified in 1996 in Title 30 of the Texas Administrative Code (TAC) §213 and are known as the "Edwards Aquifer Rules" (TCEQ, 2011). These regulations provided protection from development activities that could harm the aquifer, including residential, commercial, and industrial construction activities that are located on the Recharge and Transition Zones. Requirements included the submittal of a WPAP and a geologic assessment, and focused on regulating new construction activities that have the potential to pollute the Edwards Aquifer and hydrologically connected surface streams (TCEQ, 2011). Significant rule changes in 1999 brought the Contributing Zone into regulation under the Edwards Rules, and added a design performance standard for permanent BMPs (TCEQ, 2017). Currently, the Contributing Zone, Recharge Zone, Transition Zone, and Contributing Zone within the Transition Zone of the Barton Springs segment of the Edwards Aquifer are regulated by TCEQ rules in Travis and Hays counties. Rules relevant to both the Transition Zone and the Contributing Zone apply in areas designated Contributing Zone within the Transition Zone (TCEQ, 2011). The TCEQ has also issued guidance regarding optional enhanced water quality measures and BMPs designed to protect aquatic and karst threatened and endangered species.

The Safe Drinking Water Act of 1974 allowed the U.S. EPA to issue drinking water regulations that apply to all public water systems. These regulations set standards for maximum concentrations of constituents and provided rules for sampling of public water systems. The 1996 amendments to the Act provided new and stronger approaches to prevent contamination of drinking water, including a strong emphasis on source water protection. The City of Austin has passed a number of watershed ordinances aimed at protecting the water supply and environmentally sensitive watersheds in the Austin area from water quality degradation. These ordinances include requirements for setbacks, impervious cover limits, and various other water quality protection measures; additional information is provided in Section 9.5.2.

In 1987, the BSEACD was established as a groundwater conservation district for the Barton Springs segment of the Edwards Aquifer (BSEACD, 2017b). The BSEACD was created with the directive to conserve, protect, and enhance the groundwater resources in its jurisdictional area. The jurisdictional area of the BSEACD includes the Recharge and Transition Zones of the Barton Springs segment of the Edwards Aquifer, as well as additional area east of the Transition Zone in Travis, Hays, and Caldwell counties. The BSEACD regulates wells within its jurisdiction, monitors the aquifer, and administers a drought management program that includes mandatory pumpage reductions based on drought stage (BSEACD, 2017b). The drought management program allows the BSEACD to maintain sustainable levels of groundwater extraction from the aquifer. Drought status is based on Barton Springs' discharge rate and water level elevations at an observation well.

Due to the connection between surface water and groundwater, additional regulations that protect surface water quality also affect groundwater quality. These regulations are discussed in Section 9.5.3.

Groundwater Quality

Results of water quality studies of Barton Springs are good indicators of the health of discharge from the Barton Springs segment of the Edwards Aquifer. While Barton Springs generally has high-quality water, concern regarding water quality is warranted due to the vulnerability of karst aquifers to contamination and the rapid urbanization in the area (Small et al., 1996; Sharp, 2010).

An early study of groundwater quality in Travis County found that groundwater was of overall good quality, but recommended establishing a network of water-quality observation wells (Brune and Duffin, 1983). Slade et al. (1986) studied water quality in streams, wells, and springs in the Barton Springs segment and concluded that "the quality of water in the Edwards Aquifer is generally very good" and that "no regional contamination problems have been identified by this water-quality sampling program."

This and subsequent studies analyzed a variety of constituents, including nutrients, physicochemical properties, indicator bacteria, major ions, trace elements, hydrocarbons, and pesticides.

The City of Austin and surrounding areas have grown rapidly since the early 1980s, and the City of Austin has monitored the aquifer and Barton Springs to determine the effects of urbanization on water quality. In 2000, City of Austin staff analyzed water quality sampling data taken between 1975 and 1999. These data indicated a statistically significant change in specific conductance, sulfate, turbidity, total organic carbon, and dissolved oxygen--all of which were linked by the researchers to increased urbanization (Turner, 2000). However, it should be noted that significant trends were not observed in other constituents that are commonly considered pollutants, such as nutrients or TSS. A later study of water quality over time at Barton Springs and other, related springs found similar trends of decreasing dissolved oxygen and increasing conductivity over time (Herrington and Hiers, 2010). This study also measured increases in nitrate concentrations; the trends related to dissolved oxygen and nitrates were of particular concern due to the potential for impacts on both the Barton Springs salamander and aesthetic impairments in the swimming pool (Herrington and Hiers, 2010).

In 2003, in response to concerns following an *Austin American-Statesman* article about the quality of water at Barton Springs, the City of Austin closed the Barton Springs Pool and sought a health consultation from the U.S. Department of Health and Human Services (DHHS). DHHS evaluated 12 years of data collected by USGS, City of Austin, LCRA, and TCEQ, and assessed the public health risk associated with human exposure to the 27 potential contaminants identified in the data. DHHS concluded that there was no information to support the contention that swimming every day in Barton Springs Pool would result in adverse health effects and that swimming in Barton Springs Pool posed no apparent public health hazard (U.S. DHHS 2003). A study conducted by TCEQ and EPA in the same year found that sediments from Barton Springs Pool were not toxic and that pollutants were present at levels typical of urban waterbodies (TCEQ, 2003).

Barton Springs Pool is often closed after storm events for maintenance and cleaning. Rainfall has been observed to influence both the quantity and quality of discharge at Barton Springs. A USGS study found that, under stormflow conditions, concentrations of nitrate and several major ions decreased, likely due to the dilution of these constituents (Mahler et al., 2006). In contract, “concentrations of other constituents, including TSS, potassium, and herbicide and insecticide components, were found to increase following storm events” (Mahler et al., 2006). During a wetter-than-normal period (September 2009–March 2010), increased levels of nitrogen and major ions

and decreased densities of bacteria were observed in Barton Springs discharge (Mahler et al., 2011a). These values were correlated with conditions in recharging streams, demonstrating the influence of streamflow and climatic conditions on Barton Springs water quality.

During the early 2000s, anthropogenic contaminants, including atrazine (an herbicide), chloroform (a drinking-water disinfection by-product), and tetrachloroethene (a solvent), were recorded in low concentrations at Barton Springs (Mahler et al., 2006). Routine sampling also identified the frequent occurrence of three other herbicide compounds – DEA (an atrazine degradate), prometon, and simazine – and potassium (associated with fertilizer). However, routine sampling did not reveal insecticide or fungicide compounds. Trace metals associated with both human-derived and natural sources were also detected. All of these constituents were detected at levels well below drinking water standards (Mahler et al., 2006). However, this study demonstrated the influence of water quality in recharging streams on water quality at Barton Springs, even during non-stormflow conditions.

More recent studies have characterized concentrations of nitrate and wastewater compounds in the Barton Springs segment and their potential relation to wastewater sources in the Contributing Zone. Nitrate concentrations in Barton Springs and the five streams that provide most of its recharge were much higher during 2008–2010 than earlier, in the 1990–2008 period, based on USGS data (Mahler et al., 2011b). This nitrate is likely biogenic nitrogen (from human or animal waste, or both), and septic systems and land-applied treated wastewater effluent are likely sources contributing nitrate to the recharging streams (USGS, 2011). Elevated nitrate concentrations likely resulted in part from the transition from dry to wet conditions in fall 2009, but similar transitions also occurred during 1990-2008, indicating that increased nitrogen loading associated with population growth was likely also a contributing factor (Garner and Mahler, 2007; USGS, 2011). Excessive levels of nitrates and other wastewater compounds can cause algal blooms, which can decrease dissolved oxygen levels and threaten other aquatic species (USGS, 2011). Since the population over the Barton Springs Contributing and Recharge Zones is projected to double between 2010 and 2035, the direct discharge of treated wastewater into Contributing Zone streams is anticipated (USGS, 2011). Currently, at least one permit has been issued for direct discharges of wastewater in the Bear Creek watershed (USGS, 2011).

The City of Austin has acquired over 27,700 acres as designated WQPLs since 1998, and is continuing to purchase land that may benefit groundwater quality. In 2012, Austin voters approved Bond Proposition 13, which provided $30,000,000 to the City to fund the purchase of land in the Barton Springs segment Contributing and Recharge Zones, the arrangement of conservation easements to protect water quality, and the

preservation of open space in perpetuity (COA, 2017a). Tracts of land targeted for purchase or easement may include those that would protect aquifer recharge waters, preserve water quality, preserve critical baseflows and provide a contiguous buffer where tracts are located next to land with existing protection and other public land (COA, 2017a).

Despite the overall good water quality of Barton Springs, the presence of anthropogenic contaminants and changes in physicochemical properties of aquifer water detected by researchers over the past few decades signify the potential effects of growing regional urbanization on aquifer water quality. Urbanization has been identified as one of the most significant sources of water quality degradation that can affect the future survival of central Texas salamanders (USFWS, 2013). Specific constituents that could affect salamanders or their habitat include polycyclic aromatic hydrocarbons (which originate from petroleum products or atmospheric deposition), pesticides, and nutrients, as well as changes in water chemistry (including conductivity, salinity, and dissolved oxygen) (USFWS, 2013). Monitoring of water quality in the Barton Springs segment of the Edwards Aquifer is ongoing by the BSEACD, USGS, and the City of Austin. As the proposed project would occur in the Recharge and Transition Zones of the Barton Springs segment, the cumulative impacts of the project on this sensitive resource and on listed salamander species will be evaluated.

Groundwater Quantity

The Barton Springs segment of the Edwards Aquifer provides water for a variety of uses including industrial, agricultural, municipal, recreation, and private wells. These uses collectively account for the discharge component of the aquifer's water budget. As discussed above, recharge occurs predominantly in stream channels, and is therefore heavily influenced by contributing streams. Water levels in the aquifer have been monitored with increasing regularity since the mid-1800s, and springflow discharging from Barton Springs has been measured continuously since 1917 (Scanlon et al., 2001; Hunt et al., 2012b). Increased interest in the availability of water in the aquifer arose during the seven-year drought of the 1950s, during which record low springflow was recorded at Barton Springs (Brune and Duffin, 1983). More recent trends in groundwater quantity are discussed in the remainder of this section.

Springflow discharging from Barton Springs is often used to evaluate the overall water levels of the Barton Springs segment of the Edwards Aquifer, and is closely monitored by a number of agencies. The long-term average springflow at Barton Springs is 53 cubic feet per second (cfs) (Scanlon et al., 2001; Hauwert et al., 2004). Mahler et al. (2006) and the City of Austin define low flow as below 40 cfs; the BSEACD declares Alarm Stage Drought when the 10-day average of Barton Springs is equal to or below

38 cfs (Hunt et al., 2012a). Critical Stage Drought is declared when the 10-day average is equal to or below 20 cfs.

Fluctuations in water level in the Barton Springs segment of the Edwards Aquifer represent changes in storage due to hydrologic stresses (Hunt and Smith, 2006). These fluctuations are due to a combination of seasonal and long-term (months to years) climatic changes that influence recharge via precipitation and anthropogenic changes in recharge and discharge rates (Hunt and Smith, 2006; Mahler et al., 2006). Water levels are generally lowest during extended periods of drought (Brune and Duffin, 1983), as was observed during the severe drought conditions in 2011. During this period, the Austin area received only 33 percent of its average annual precipitation total, and diminished streamflow led to reduced recharge, lowering water levels in the aquifer and decreasing springflow at Barton Springs to Critical Stage Drought levels (Hunt et al., 2012a).

Recharge and discharge rates to the aquifer are influenced by a variety of anthropogenic factors. Pumpage removes water from the aquifer and can decrease discharge rates at springs, while recharge may be decreased by (1) increasing pumpage capturing groundwater upstream of contributing streams, (2) increasing temperatures and evapotranspiration rates, thereby reducing recharge, and (3) land-use practices that increase rates of evapotranspiration (Hunt et al. 2012b). In 1983, Brune and Duffin found that groundwater discharge (the sum of springflow and groundwater pumpage) was approximately equal to average annual recharge. However, more recent studies performed by the BSEACD have demonstrated the need for a reduction in pumpage from the Barton Springs segment of the Edwards Aquifer during periods of extreme drought to protect water wells from going dry and to maintain the quantity and quality of flow at Barton Springs (Smith and Hunt, 2004). Smith and Hunt (2004) used groundwater models to predict that, with projected pumping and a recurrence of drought-of-record conditions, springflow at Barton Springs would be greatly diminished or stopped. Additionally, under these conditions, as many as 19 percent of all water supply wells in the District could be negatively impacted and the potential for saline water to flow into the freshwater aquifer would increase (Smith and Hunt, 2004).

The contribution of recent recharge to spring discharge has been the subject of numerous recent studies. Mahler et al. (2006) reported that recharge water contributed from 0 to 55 percent of spring discharge during non-stormflow conditions, while Mahler et al. (2011b) found that stream recharge contributed about 80 percent of Barton Springs discharge during a wetter-than-normal period. The rate of groundwater flow within the Recharge and Transition Zones has been studied using dye trace simulations. One study found an average travel time of five to eight days from

injection sites to Barton Springs (Hauwert, 2012), while other studies have found that water is discharged at Barton Springs within two to four days of dye injection (BSEACD, 2003; Hunt et al., 2013). Groundwater flow rates are correlated to springflow rates, and vary under differing climatic conditions (BSEACD, 2003).

A review of historical precipitation and hydrological data from Central Texas suggests that a change to a wetter climate has occurred since the 1960s (Hunt et al., 2012b). This shift has correlated to an increase in streamflows and springflows at Barton Creek during the past 60 years, indicating increased water within the Edwards Aquifer over this time period (Hunt et al., 2012b). At the same time, base flow, which is the portion of stream flow that is not runoff and results from deep subsurface flow and delayed shallow subsurface flow, has decreased and variation in flow rates has increased. These factors have resulted in relatively little change to total discharge at Barton Springs over time (Hunt et al., 2012). Moreover, base flow declines are directly related to increased pumping from the aquifer and pumping from the Barton Springs segment has increased dramatically in recent years, from less than 2,000 acre-feet per year in 1970 to approximately 5,700 acre-feet per year in the mid-2000s (Brune and Duffin, 1983; Hunt et al., 2012b). Future water use is difficult to project because of unpredictable weather conditions and the potential for alternative water supply scenarios. However, it is projected that water levels within the Edwards Aquifer may decline in response to intensification of future pumpage and potential future drought conditions associated with a changing climate (Scanlon et al., 2001). Due to the complicated relationship between climate factors, the hydrology of the Edwards Aquifer, and limited predictability, the BSEACD has started to evaluate alternative sources of water for the growing population of central Texas (Smith et al., 2013).

Surface Water

Resource Study Area

The geographic RSA for cumulative effects to surface water is based on the boundaries of the 12-digit hydrologic unit code (HUC) watersheds that intersect the proposed project as delineated by the USGS. These watersheds include Lake Austin–Town Lake, Slaughter Creek–Onion Creek, and Williamson Creek–Onion Creek watersheds and cover approximately 92,551 acres. The watershed boundaries were selected for the RSA because all surface water runoff in the project area would be contained within the geological features that define the boundaries of these watersheds (**Figure 4** in **Attachment D**).

The earliest temporal boundary for the surface water RSA dates from 1979 (the earliest point at which water quality sampling data collected by the TCEQ is available). The future temporal horizon is 2040 (the horizon year of the long-range transportation plan, *CAMPO 2040 Regional Transportation Plan*). Historical water quality data within

the RSA are presented below in order to define the health of the resource and establish historical trends. Surface water and groundwater quality are closely related within karst landscapes, and threats to one can quickly affect the other, as well as potentially affecting the two federally endangered species of salamander found within Edwards Aquifer that depend on water quality to survive.

Onion Creek is a common drainage for two of the three watersheds in the RSA. The Slaughter Creek–Onion Creek and Williamson Creek–Onion Creek watersheds both contain segments of Onion Creek, which are named based on the major tributaries that join each segment. The Lake Austin–Town Lake watershed does not include a segment of Onion Creek.

The Slaughter Creek–Onion Creek watershed encompasses 28,351 acres. Onion Creek flows into this watershed immediately below its confluence with Bear Creek and flows out of this watershed shortly after being joined from the south by Rinard Creek and from the north by Slaughter Creek. Onion Creek flows from the RSA in a northeasterly direction toward its confluence with the Colorado River approximately 10 linear miles away. Slaughter Creek flows from the northern part of the Slaughter Creek–Onion Creek watershed in a southeasterly direction toward its confluence with Onion Creek, draining approximately 70 percent of the watershed. Rinard Creek drains approximately 20 percent of the watershed at the southernmost portion of the watershed. Major creeks in the watershed include Slaughter Creek and three of its tributaries. In total, approximately 103 linear miles of creeks lie within this watershed. The City of Austin (including its Full Purpose Jurisdiction and the 2-mile ETJ) and the Village of San Leanna boundaries encompass 100 percent of the watershed. Approximately 12,733 acres (45 percent) are under City of Austin Full Purpose Jurisdiction.

The Williamson Creek–Onion Creek watershed lies to the north of the Slaughter Creek-Onion Creek watershed. The Williamson Creek-Onion Creek watershed encompasses approximately 30,086 acres. Approximately 92 linear miles of creeks lie within this watershed. Onion Creek flows into this watershed just north of its confluence with Slaughter Creek and flows out of this watershed shortly after being joined by Williamson Creek. Williamson Creek flows from the northwestern part of the watershed in a southeasterly direction toward its confluence with Onion Creek. The cities of Austin (Full Purpose Jurisdiction, 2-mile ETJ, 5-mile ETJ, and Limited Purpose Jurisdiction) Bee Cave (Full Purpose Jurisdiction and ETJ), and West Lake Hills (Full Purpose Jurisdiction and ETJ) cover the watershed.

The Lake Austin–Town Lake watershed encompasses approximately 34,114 acres. Approximately 170 linear miles of creeks lie within this watershed. Jurisdictions in the Lake Austin-Town Lake watershed include the cities of Austin (Full Purpose

Jurisdiction, 2-mile ETJ, 5-mile ETJ, and Limited Purpose Jurisdiction), Bee Cave (Full Purpose Jurisdiction and ETJ), and West Lake Hills (Full Purpose Jurisdiction and ETJ).

Current Conditions

The City of Austin Department of Watershed Protection, the LCRA, TCEQ, and USGS, among others, monitor water quality in locations throughout the study area. Each entity reports their findings in various ways including the LCRA Water Quality Index, the TCEQ Integrated Report for Surface Water Quality, and the City of Austin Environmental Integrity Index.

TCEQ's Integrated Report is published every other year and includes the Section 303(d) list, which is an EPA-mandated list of waterbodies that are categorized as "impaired" when they do not meet pre-determined water quality standards. Impairment is determined in relation to beneficial uses that each waterbody segment is expected to provide, and sampling protocols vary, in part, by the assigned uses. In 2014, Segment 1043 (Lake Austin from Quinlan Park upstream to Mansfield Dam) was included on the Section 303(d) list for depressed dissolved oxygen. Segment 1403K (Taylor Slough South from the confluence of Lake Austin to the headwaters near South Meadow Circle within the Lake Austin–Town Lake watershed) was included on the 2014 Section 303(d) list for bacteria. Segment 1427 (Onion Creek from the confluence with the Colorado River in Travis County to the most upstream crossing of FM 165 in Blanco County) was listed as impaired for sulfate. Segment 1427A (Slaughter Creek) was listed as impaired relative to the macrobenthic community. The macrobenthic community is made up of species of aquatic organisms such as insects, mollusks, and other invertebrates (e.g. worms, leeches, etc.) which are visible to the un-aided eye (macro-) and live out some or all of their lives at the bottom (benthos) of the waterbody. The types and number of species present are indicators of water quality, and the community is sampled because of its usefulness in indicating a waterbody's capability to support the Aquatic Life Use category. The macrobenthic community is susceptible to a wide array of stressors including man-made pollutants and natural weather patterns such as flood and drought.

The City of Austin Watershed Protection Department samples water quality parameters in 49 watersheds within the City of Austin's planning area to compile an Environmental Integrity Index (EII). The Watershed Protection Department recognizes slightly different watershed delineations than those represented in the RSA. Most notably, the Lake Austin–Town Creek watershed identified on the Surface Water Quality RSA map (**Figure 4** in **Attachment D**) is comprised of a number of subwatersheds included in the City of Austin's EII reporting data: Barton Creek, Eanes Creek, Bee Creek, Johnson Creek, Lake Austin, Taylor Slough South, Taylor Slough North, Dry Creek North, and Shoal Creek. Every other year the monitoring results are scored and assigned relative values.

In addition to individual parameter scores, an overall EII score is assigned. Data are collected for dissolved oxygen, pH, conductivity, ammonia, nitrate, ortho-phosphates, TSS, turbidity, *E. coli*, benthic macroinvertebrates, and diatoms. The scores are ranked "Very Bad," "Bad," "Poor," "Marginal," "Fair," "Good," "Very Good," and "Excellent." **Table 16** provides a summary of the most recent scores for the watersheds or subwatersheds within the RSA.

Table 16: City of Austin Environmental Integrity Index Scores

Watershed	EII Score (Year)	Rating
Slaughter Creek	77 (2014)	Very Good
Williamson Creek	70 (2013)	Good
Barton Creek	79 (2013)	Very Good
Eanes Creek	43 (2014)	Marginal
Bee Creek	76 (2014)	Very Good
Johnson Creek	52 (2013)	Fair
Taylor Slough South	57 (2014)	Fair
Taylor Slough North	74 (2014)	Good
Dry Creek North	72 (2014)	Good
Shoal Creek	59 (2013)	Fair

Source: City of Austin Environmental Integrity Index, 2017 (COA, 2017b).

Trends

Regulatory History

The City of Austin has passed a number of watershed ordinances that outline protection criteria for the water supply and environmentally sensitive watersheds within the City of Austin for local government and private citizens. These ordinances are superseded by the State of Texas laws governing transportation projects; therefore, the ordinances do not apply to TxDOT projects. The first of these, the Lake Austin Watershed Ordinance, was adopted in 1980 and included provisions addressing impervious cover limits, water quality and quantity structural controls, and a requirement for an erosion/sedimentation control plan prior to subdivision application approval (COA, 1980). Subsequent ordinances added provisions for stream set-back requirements, a water quality zone to remain free of most development types, protection of watersheds that do not provide drinking water, and the designation and protection of critical environmental features (COA, 2013b). The Save Our Springs (SOS) Ordinance, which was adopted in 1992, required non-degradation and limited impervious cover to 15 percent for all development in the Recharge Zone, 20 percent for development in the Barton Creek portion of the Contributing Zone, and 25 percent for development in the remaining portions of the Contributing Zone in Williamson, Slaughter, Bear, Little Bear, and Onion Creeks, to be calculated on a net site area basis (COA, 2013b). The most recent watershed protection ordinance was passed in 2013;

this ordinance aimed to improve creek and floodplain protection, prevent unsustainable public expense on drainage systems, simplify development regulations where possible, and minimize the impact on the ability to develop land (COA, 2017c).

Within the Barton Springs segment of the Edwards Aquifer, the City of Austin owns or controls development rights on over 27,700 acres that are designated WQPLs (COA, 2017a). These lands were purchased using funds from two utility bonds approved in 1998 and are managed to provide optimal water yield and to protect both water quality and quantity recharging into these areas (LBJWC, 2010). Additional bonds were passed in November 2012 (Proposition 13: Open Space and Watershed Protection). These lands are permanently protected from urbanization to preserve pervious cover and current hydrologic conditions. Several measures are listed in §13- 7-36.4 of the SOS Ordinance that pertain to impervious cover limitations and construction within Critical Water Quality Zones (CWQZ) and Water Quality Transition Zones (WQTZ). A CWQZ is established along each waterway classified under City of Austin Land Development Code (LDC) §25-8-91 (Waterway Classifications). The boundaries of a CWQZ may coincide with the boundaries of the 100-year floodplain, except under certain circumstances. A WQTZ is established adjacent and parallel to the outer boundary of each CWQZ. The width of a WQTZ is 100 feet for a minor waterway, 200 feet for an intermediate waterway, and 300 feet for a major waterway (LDC §25- 8-93).

Surface Water Quality and Quantity

The Texas Integrated Report of Surface Water Quality (i.e., 303(d) listed waters) describes the status of Texas' natural waters based on historical data and evaluates the quality of surface waters against the Texas Surface Water Quality Standards. Available impaired waterbody listings from within the RSA show that, in the past, causes of impairment have been varied. However, during most recent reporting cycles four segments within the RSA have been listed on the 303(d) list: Lake Austin for depressed dissolved oxygen (listed in 1996); Taylor Slough South for bacteria (listed in 2002); Onion Creek for sulfate (listed in 2014); and Slaughter Creek for impaired macrobenthic communities (listed in 2002).

The City of Austin's EII program was designed to monitor and assess the chemical, biological, and physical integrity of Austin's surface waters over time. Water chemistry, biological, and physical surveys are conducted and compiled on a two-year basis to track the status of Austin's watersheds. **Table 17** provides a summary of the EII scores for all watersheds within the RSA. In general, lower integrity scores are typically associated with urbanized areas due to intense development that did not have progressive environmental rules (COA, 2016e). For the watersheds within the RSA, the

EII scores have remained relatively stable, with five watersheds increasing or unchanged, and five watersheds reporting slightly reduced scores.

Table 17: Historic City of Austin Environmental Integrity Index Scores						
Watershed	2000/ 2001	2003/ 2004	2006/ 2007	2009/ 2010	2011/ 2012	2013/ 2014
Slaughter Creek	75	65	77	79	70	77
Williamson Creek	70	69	67	62	55	70
Barton Creek	77	87	75	77	77	79
Eanes Creek	61	68	60	66	67	43
Bee Creek	78	75	81	80	79	76
Johnson Creek	53	56	47	51	36	52
Taylor Slough South	60	56	60	60	59	57
Taylor Slough North	61	61	62	69	68	74
Dry Creek North	69	64	63	68	72	72
Shoal Creek	60	54	55	63	57	59

Source: City of Austin Environmental Integrity Index, 2017 (COA, 2017b).

Although not specifically addressed in the City of Austin's EII reports or the TCEQ's 303(d) list, surface water quality may be impacted by roadway-associated pollution as a result of highway maintenance, accidental spills, and vehicle use. Routine maintenance activities introduce pollutants such as pesticides, paint, and herbicides to the roadside environment. Accidental spills that range from small leaks, to loss of fluids during crashes, to tanker truck spills can introduce pollutants as well. Vehicle use also generates a number of pollutants. The processes that control the build-up of these pollutants and the processes that control their removal from the roadway have been well studied in an effort to address highway-associated pollution loads in receiving surface waters. Due to the direct connection between surface water and groundwater in Central Texas, the discussion in **Sections 9.1.2.1** and **9.1.2.2**, are relevant to the surface water quality discussion herein. In particular, Barrett's (2016) analysis of 20 years of water quality data, including roadway runoff constituents concluded that BMPs are successful at removing pollutants from highway runoff, and cited the findings of historical water quality data collected by the City of Austin and the USGS at Barton Springs. The combination of robust data collection from the City's watershed protection department, USGS, and other researchers, provides the data to support long-term monitoring of surface water quality in response to increasing urbanization in the RSA.

Water quantity is highly variable in the study area and can change significantly in a short time period. Streams outside of aquifer recharge zones typically receive water from the water table and are therefore more likely to sustain a base flow between rain events. Stream segments that flow through the aquifer recharge zone can lose a

considerable portion of their flow to swallets. Factors that influence the quantity of water in streams include weather (rain/drought) conditions and land use patterns. Impervious cover often concentrates overland flow to channelized or natural stream areas, which can cause increased flow volume and velocity. The extent to which BMPs appropriate for urban areas, such as detention ponds and "grow zones" of vegetation next to creeks, are used varies widely and is based on the regulations set by local governments.

9.2 Step 2: Direct and Indirect Effects on Each Resource from the Proposed Project

9.2.1 Federally Listed Threatened and Endangered Species—Barton Springs Salamander and Austin Blind Salamander

The proposed project may affect, but is not likely to affect, the Barton Springs and Austin blind salamanders. There is no known suitable habitat for either the Barton Springs salamander or the Austin blind salamander within the project study area. Therefore, no direct impacts to either species from the proposed project are anticipated.

As discussed in **Section 4** of this addendum, indirect impacts are not expected to occur to Barton Springs or Austin blind salamanders from the proposed project. The proposed project area includes portions of the Edwards Aquifer Recharge and Contributing Zones. Recharge from lower Williamson Creek has been documented by dye trace studies to flow to the Barton Springs complex. Potential impacts to groundwater resources are discussed in more detail in **Section 9.2.1.2** of this report. BMPs would be incorporated into the project to prevent potentially contaminated runoff from entering the Edwards Aquifer. To mitigate for the increase of impervious cover within the project area and to ensure protection of downstream resources (including salamanders), BMPs would be applied to reduce the intensity of stormwater runoff and amount of roadway pollutants entering Williamson and Slaughter Creeks.

There are approximately 10,192 acres of undeveloped, developable land (not already platted or planned for development) within the 85,281-acre AOI of the project analysed for indirect impacts. Developments on these lands would adhere to the Edwards Aquifer Rules and TCEQ requirements as discussed in **Section 9.5**. Furthermore, any developments with the potential to impact the groundwater habitat of the protected salamander species could be subject to regulation under the Endangered Species Act. Through the use of BMPs, adherence to Edwards Aquifer rules through the preparation of a WPAP, and adherence to TPDES through the preparation of a SW3P, significant indirect impacts to the Barton Springs and Austin blind salamanders are not expected as a result of the project. Reasonably foreseeable projects undertaken within the 258,039-acre RSA would be subject to regulation under the ESA if it is anticipated that

they would impact either the Barton Springs or Austin blind salamanders or their habitat.

9.2.2 Water Quality – Groundwater

Potential consequences of the proposed project may include the potential for runoff from the project site to affect the Barton Springs segment of the Edwards Aquifer through surface water drainage and groundwater recharge. Potential effects to groundwater resources include short-term potential for pollutants in stormwater runoff from the construction site to reach the Barton Springs segment of the Edwards Aquifer through surface drainage and groundwater recharge; long-term potential for pollutants in stormwater runoff from the completed roadway, including from spills, to reach the Barton Springs segment of the Edwards Aquifer through surface drainage and groundwater recharge; and potential for reductions in recharge to the Edwards Aquifer resulting from increases in impervious cover.

Erosion and sedimentation during construction of the roadway could have short-term, adverse effects on receiving waters in the RSA. Due to the potential for recharge to the Edwards Aquifer from the project area and areas downstream, BMPs would be utilized to prevent or reduce the pollution of runoff from the project area, including minimizing impacts to water quality as a result of erosion and sedimentation.

The proposed project would add impervious cover to the watersheds in the study area. Implementation of the *Preferred Alternative* would add approximately 74 acres of impervious cover within the water quality study area, as identified in the *Preliminary Water Quality Analysis and Design Report* (K Friese & Associates, Inc., 2017). The addition of impervious cover would potentially increase runoff and slightly reduce recharge to the Barton Springs segment of the Edwards Aquifer. Highway stormwater runoff may contain a wide variety of possible pollutants potentially impacting surface and groundwater resources, including metals, solids, nutrients, bacteria, herbicides, and hydrocarbons such as fuel oils and gasoline (Barrett et al., 1995). BMP options continue to evolve and improve and would reduce adverse water quality impacts from stormwater runoff.

As previously mentioned, there are approximately 10,192 acres of undeveloped, developable land (not already platted or planned for development) within the AOI of the project. Factors such as the large amount of land protected from development and local regulations that limit impervious cover would constrain the amount of induced growth possible in the AOI. Several local planning experts maintain that development will continue to occur in the area regardless of whether the proposed project is constructed.

Induced growth could have some effect on water resources because induced development would result in increased impervious cover, which could in turn have an effect on water quality. However, the proposed project would not have a substantial adverse effect on water quality in the AOI because of the high percentage of managed areas and the implementation of regulations and BMPs.

Development projects that do occur within the AOI would have to comply with the relevant land development code for projects within city limits and ETJ boundaries, where applicable (see **Figure 5** in **Attachment D**). Areas outside municipal limits would be subject to state and federal laws. Substantial indirect impacts are not anticipated to occur to groundwater quality due to the limited potential for induced development and the existing regulatory processes in place to avoid potential adverse impacts to groundwater quality.

9.2.3 Water Quality – Surface Water

The project area is located in the Colorado River basin and crosses the Slaughter Creek, Williamson Creek, and Barton Creek watersheds. Surface and groundwater resources associated with the Oak Hill Parkway may be impacted as a result of the proposed project. Placement of the roadway could encroach on the surface or subsurface drainage areas of unknown adjacent caves/sensitive recharge features, altering the hydrologic regime in those features.

Proposed water quality protection measures and BMPs to be utilized under either build alternative would remove at least 80 percent of the incremental increase in TSS that results from the project's addition of impervious cover in the Edwards Aquifer Recharge Zone, in compliance with the TCEQ's Edwards Aquifer Rules. In addition, the proposed water control facilities for both alternatives are anticipated to exceed the total TSS removal required by TCEQ. The potential for pollutants in stormwater runoff from the construction site and completed roadway to enter the aquifer and the potential for changes in recharge rates to the aquifer resulting from increases in impervious cover would be minor. Impacts would be minimized by the use of robust BMPs during roadway construction and operation. These BMPs include multiple levels of water quality treatment measures, bioretention ponds, vegetative filter strips, and a hazmat trap at Williamson Creek. During construction, project activities would be guided by an Environmental Compliance Management Plan which would include protocols designed to avoid environmental impacts. Stormwater runoff would also be treated by BMPs over the Recharge and Contributing Zone.

Impacts to surface waters in the project area would also be minimized using BMPs during both construction and operation of the proposed project. More than five acres of earth would be disturbed as a result of the *Preferred Alternative*, requiring

preparation and implementation of a SW3P for the project. Stormwater runoff would be addressed through compliance with the TPDES and Edwards Aquifer Protection Plan. Any impacts to jurisdictional waters would comply with Section 404 of the CWA and would be permitted accordingly using a Nationwide Permit 14 with or without a Preconstruction Notification.

Approximately 10,192 acres of undeveloped land within the AOI could be subject to development in the foreseeable future. Factors such as the large amount of land protected from development and local regulations that limit impervious cover would constrain the amount of induced growth possible in the AOI. With regard to potential indirect effects on water quality resulting from potential development by others in the AOI, regulations are in place and applicable to proposed developments to minimize impacts to the resource. These include TCEQ regulations requiring preparation of SW3Ps and WPAPs, including use of BMPs in addition to the City of Austin drainage/water quality requirements. USACE Section 404 provisions of the CWA govern activities that would affect waters of the U.S. and wetlands, regardless of who proposes the development activity. Individual developers would be responsible for complying with these regulations. Substantial indirect impacts are not anticipated to occur to surface water quality due to the limited potential for induced development and the existing regulatory processes in place to avoid potential adverse impacts to surface water quality.

9.3 Step 3: Other Actions – Past, Present, and Reasonably Foreseeable – and Their Effect on Each Resource

According to TxDOT's 2016 guidance, the cumulative effects analysis should include "the full range of other actions, not just transportation projects" with a focus on activities "that are likely or probable, rather than merely possible" (TxDOT 2016, FHWA 2003). A combined RSA, which encompasses each of the resource-specific RSAs, was used to obtain information about past, present, and reasonably foreseeable future projects. **Figure 5** in **Attachment D** shows the jurisdictions that fall within the combined RSA. The combined RSA is used from here forward in the analysis because it encompasses the other RSAs and allows for more efficient discussion of other actions, possible cumulative effects, and mitigating factors. In addition to researching various published documents and plans, a simple questionnaire explaining the project and requesting information about other actions was distributed to several entities including the cities of Austin, Bear Creek, Bee Cave, Dripping Springs, and Sunset Valley, as well as Hays and Travis counties.

One overarching trend that provides a backdrop for resource-specific analysis is population growth in the jurisdictions within the combined RSA. **Table 18** shows historical and current population in the combined RSA and **Table 19** shows projected

population in the combined RSA. Both tables indicate substantial population growth. The cities of Kyle, Buda, and Bee Cave grew by especially large percentages in recent decades. Travis County more than doubled its population between 1990 and 2015, while Hays County's population more than tripled. Future population projections show that the cities of Kyle, Buda, and Sunset Valley, and Hays County overall, are expected to increase more than 100 percent between 2010 and 2040.

Table 18: Current and Historic Population in Combined Resource Study Area

City or County	Total Population by Year				Percent Change from 1990 - 2015
	1990	2000	2010	2015	
City of Austin	472,020	656,562	790,390	931,830	97.4
City of Kyle	3,325	5,314	28,016	35,733	974.7
City of Buda	498	597	1,795	13,705	2,652.0
Mountain City	377	671	648	659	74.8
Westlake Hills	1,488	2,166	2,542	3,317	122.9
City of Sunset Valley	327	365	749	698	113.5
City of Dripping Springs	1,033	1,548	1,788	2,483	140.4
Village of Bear Creek	Prior to incorporation*	360	382	388	N/A
City of Rollingwood	1,388	1,403	1,412	1,543	11.2
City of Bee Cave	241	656	3,925	6,292	2,510.8
Village of San Leanna	325	384	497	536	64.9
City of Hays	251	233	217	221	(12.0)
Travis County	576,407	812,280	1,024,266	1,176,558	104.1
Hays County	65,614	97,589	157,107	194,739	196.8

Sources: Texas State Library and Archives Commission, 2017; U.S. Census Bureau, 1990–2010.
* Census information is unavailable for unincorporated communities.

Table 19: Projected Population in Combined Resource Study Area					
City or County	Total Population by Year				Percent Change from 2010 - 2040
	2010	2020	2030	2040	
City of Austin	790,390	976,418	1,153,977	1,330,492	68.3
City of Kyle	28,016	50,808	77,050	92,000	228.4
City of Buda	7,295	11,489	16,316	22,195	204.2
Mountain City	648	689	753	830	28.1
Westlake Hills	3,063	3,699	3,699	3,699	20.8
City of Sunset Valley	749	1,134	1,480	1,806	141.1
City of Dripping Springs	1,788	2,031	2,311	2,652	48.3
Village of Bear Creek	382	NA*	NA*	NA*	NA*
City of Rollingwood	1,412	1,421	1,429	1,436	1.7
City of Bee Cave	3,925	4,470	5,473	6,165	57.1
Village of San Leanna	497	NA*	NA*	NA*	NA*
City of Hays	217	NA*	NA*	NA*	NA*
Travis County	1,024,266	1,273,260	1,508,642	1,738,860	69.3
Hays County	157,107	238,862	313,792	398,384	153.6

Sources: U.S. Census Bureau, 2010; Texas Water Development Board 2016 Regional Water Plan, 2017
*Note that the Texas Water Development Board does not provide population projections for Bear Creek.

Figure 6 in **Attachment D** depicts past projects by development year according to the Development Services/GIS departments for Hays and Travis counties. In all, within the combined RSA, over 27,000 acres have been developed since 1970 in Hays County and over 40,000 acres have been developed between 1970 and 2014 in Travis County. **Tables E-1** (Hays County) and **E-2** (Travis County) in **Attachment E** list these subdivision developments and their acreages. Note that this is a snapshot in time and may not depict all past development projects in Hays or Travis counties within this RSA.

Given the pattern of continued population growth that has occurred in and around the project area, numerous transportation facilities and housing developments are planned within the areas encompassed by the combined RSA. The City of Austin tracks emerging development projects in its development jurisdiction. **Table E-3** in **Attachment E** lists and describes the emerging projects in the City of Austin within the combined RSA. Additional information about emerging/planned projects within the combined RSA was provided by staff from the cities of Austin, Drippings Springs and Bee Cave during communications that took place in 2016-2017. The emerging and planned projects for Austin, Dripping Springs, and Bee Cave are depicted on **Figure 6** in **Attachment D** along with the historic subdivision development data for Travis and Hays counties.

Table 20 lists all of the planned developments in Dripping Springs and Bee Cave and some of the larger emerging projects in Austin within the combined RSA. Table 20 also includes information about planned transportation projects within the combined RSA. This is a partial list of planned projects as of March 2017. See also Attachment F which includes transportation, land use, and other planning maps from various jurisdictions. These maps demonstrate that development is tracked as best as possible by the various planning entities within these jurisdictions, who also have some degree of land development oversight and control.

Table 20: Planned Projects in the Combined Resource Study Area

Project Location	Description
TRANSPORTATION PROJECTS	
Interstate Highway (IH) 35 from SH 45 SE to SH 45 N	IH 35 Improvements Projects
US 290 W from RM 165 to Nutty Brown Road/Travis County line	Enhance roadway; widen roadway from 4 lanes to 6 lanes between RM 12 and Nutty Brown Road
SH 45SW from Loop 1 to FM 1626	Construction of a 4-lane tolled freeway; shared use path where feasible
SH 45SW from FM 1626 to IH 35	Environmental and preliminary engineering analysis for a new freeway
RM 150 from RM 12 to FM 3237	Widen roadway from 2 lanes to 4 lanes
Loop 1 from Cesar Chavez to Slaughter	2 Express Lanes in each direction
RM 967 from RM 1826 to IH 35	Widen roadway from 2 lanes to 4 lanes
FM 1626 from SH 45SW to IH 35	Widen roadway from 2 lanes to 6 lanes
FM 2770/Jack C. Hays Trail from RM 967 to RM 150	Widen roadway from 2 lanes to 4 lanes
RM 1826 from US 290W to RM 150	Widen roadway from 2 lanes to 4 lanes
Creek Road/CR 190 from FM 165 to US 290	Enhance roadway
Darden Hill Road/CR 162 from FM 150 to RM 1826	Enhance roadway
Elder Hill Road/CR 170 from RM 12 to FM 150	Enhance roadway
Garlic Creek Parkway from SH 45S to RM 967	Construct new roadway
Goforth Street/CR 228 from RM 967 to IH 35	Enhance roadway
Nutty Brown Road/CR 163 from US 290 to RM 1826	Widen roadway from 2 lanes to 4 lanes
Old San Antonio Road from Travis County Line to Cabelas Drive	Enhance roadway
Pursley Road/Creek Road/CR 198 from FM 165 to Mt Gainor Road	Enhance roadway
Dripping Springs North US 290 Bypass from US 290 W to US 290 East	Construct new roadway

Table 20: Planned Projects in the Combined Resource Study Area	
Project Location	**Description**
Roger Hanks Extension from US 290 W to RM 12	Construct new roadway
Dripping Springs Southeast Bypass from RM 12 to US 290 E	Construct new roadway
Escarpment Boulevard from SH 45 to FM 150 north of FM 3237	Construct new roadway
Dripping Springs Southwest Bypass/FM 150 from US 290 W to RM 12	Construct new roadway
DEVELOPMENT PROJECTS	
Bee Cave – Village Green	Mixed Use – 5 acres
Bee Cave – Bee Cave Territory Subdivision at Spanish Oaks	Mixed Use – 4 acres
Bee Cave – Spanish Oaks Hillside	Subdivision expansion – 64 residential lots, 100 acres
Dripping Springs – Anarene	New subdivision – 1,710 residential lots, 1,692 acres
Dripping Springs – Butler Ranch	New subdivision – 90 residential lots, 152 acres
Dripping Springs – Founders Ridge	New subdivision – 202 residential lots, 107 acres
Dripping Springs – Driftwood	New subdivision – 150 residential lots, 453 acres
Dripping Springs – Headwaters	New subdivision – 1,000 residential lots, 1,504 acres
Dripping Springs – Ledgestone	New subdivision – 242 residential lots, 198 acres
Dripping Springs – Parten Ranch	New subdivision – 575 residential lots, 533 acres
Austin – Avana	New subdivision – 800 residential lots, 1,020 acres
Austin – Avana Phase 2	New subdivision – 229 residential lots, 149 acres
Austin – Rancho Garza	Mixed Use – 35 acres
Austin – 1300 Dittmar	New subdivision – 233 residential units, 42 acres
Austin – Greyrock Ridge	Subdivision expansion – 387 residential lots, 177 acres
Austin – Estancia Hill Country	Mixed use – 1,550 multifamily units; 750,000 SF industrial; 905,000 SF office; 405,000 SF retail; 737 residential lots; 600 acres

Sources: Hays County Transportation Plan (adopted January 2013; amended March and June 2013)
City of Buda Transportation Master Plan Update (February 2013)
CAMPO 2040 Plan (May 2015)
City of Austin Emerging Projects (Peacock, 2017; COA, 2017d)
Communications with City of Dripping Springs staff, 2016-2017 (Coneway, 2017)
Communications with City of Bee Cave staff, 2016 (Perez, 2017)

In addition to the information gathered through questionnaires and interviews for the RSA described above, online research was conducted to identify some of the numerous transportation, land use, and conservation plans that have some overlap with the RSA. **Attachment F** includes maps of planned transportation projects and future land use plans from the various political jurisdictions that fall partially within the RSA. These plans indicate that entities in the RSA are anticipating additional growth and are planning for it in terms of infrastructure, capital improvements, zoning, and future land use plans. These plans reflect the communities' goals and visions for the future and provide a visual reference for where various jurisdictions would apply their land

development codes and subdivision development requirements, including environmental controls. In addition, maps are included that specifically represent conservation goals, such as those from the Capital Area Council of Governments (CAPCOG) Greenprint for Growth, which was a multijurisdictional visioning process for participating central Texas counties. Maps in **Attachment F** include:

- *Imagine Austin Susceptibility to Change Map*
- *Bee Cave Future Land Use Plan and Thoroughfare Plan*
- *Buda 2030 Comprehensive Plan – Future Land Development Plan*
- *Buda 2030 Comprehensive Plan – Zoning Districts Map*
- *Buda Transportation Master Plan Map*
- *CAMPO 2040 Road Projects with Centers*
- *Dripping Springs - Conceptual Future Land Use Map from Comprehensive Plan*
- *Dripping Springs Potential Development Map*
- *Dripping Springs Zoning Map*
- *Dripping Springs Transportation Plan Map*
- *Hays County Transportation Plan Map*
- *Kyle Future Land Use Map from the Kyle Comprehensive Plan*
- *Kyle Zoning Map*
- *Kyle Transportation Master Plan*
- *Travis County Growth Guidance Concepts Map*
- *CAPCOG Greenprint for Growth Regional Overall Conservation Opportunities*

Based on the projected growth identified within the combined RSA, it is anticipated that additional roadway, residential, commercial, and other planned projects are expected to be constructed within the combined RSA. Reasonably foreseeable developments do have the potential to impact water quality due to stormwater runoff and possible stream modifications related to an increase in stormwater runoff. This potential for water quality degradation could be a threat to both the Austin blind salamander and Barton Springs salamander. However, developer adherence to regulations and guidance related to stormwater quality would avoid or minimize adverse impacts to the quality of the surface water within the combined RSA.

9.4 Step 4: The Overall Effects of the Proposed Project Combined with Other Actions

9.4.1 Methodology

As previously stated, the approach for conducting the cumulative impacts analysis is ultimately guided by TxDOT's *Cumulative Impacts Analysis Guidelines* (TxDOT, 2016b). A combination of planner interviews, cartographic analysis, technical expert research, and data collection was used in order to assess the overall effects of the proposed project combined with other actions.

9.4.2 Barton Springs and Austin Blind Salamander

The proposed project may affect, but is not likely to adversely affect, the Barton Springs or Austin blind salamander. The Barton Springs and Austin blind salamanders are not known to occur within the limits of the project area. Both species are known to occur within the Barton Springs segment of the Edwards Aquifer. Although no direct effects to salamanders are anticipated, indirect effects on these species due to water quality impacts are considered due to the location of the project over the Recharge Zone and due to the project's location in the Barton Springs Segment of the Edwards Aquifer. Through the use of BMPs, adherence to Edwards Aquifer rules through the preparation of a WPAP, and adherence to TPDES through the preparation of a SW3P, significant indirect impacts to the Barton Springs and Austin blind salamanders are not expected to occur as a result of the project. Reasonably foreseeable projects undertaken within the RSA would be subject to regulation under the ESA if it is anticipated that they would impact either the Barton Springs or Austin blind salamanders or their habitat.

The geographic RSA for the salamanders covers approximately 258,039 acres. Within that area there are currently 23,104 acres (or 9 percent of the RSA) of impervious cover as compared to 234,935 acres of land that are still potentially permeable to groundwater. Of the impervious cover, 11,956 acres are located over the Edwards Aquifer Contributing Zone, 656 acres are located over the Edwards Aquifer Contributing Zone within the Transition Zone, 6,986 acres are located over the Edwards Aquifer Recharge Zone, and 3,506 acres are located over the Edwards Aquifer Transition Zone. An analysis of past trends of impervious cover is summarized in **Table 20**. The incremental effects from the proposed project to these species are negligible in the context of the overall cumulative effects of the reasonably foreseeable future projects assessed in this document.

9.4.3 Water Quality – Groundwater

Stormwater runoff and streams crossing the Recharge Zone are the main sources of recharge to the Edwards Aquifer. Consequently, the quality of these waters is directly

related to the quality of water entering the aquifer. As development in the RSA continues, the potential for degradation of stormwater increases with an increase in impervious surface and additional point source pollutant sources (e.g., septic systems, industrial facilities, accidental spills, and underground storage tanks). As a result, the potential for degradation of the Edwards Aquifer exists as well. As discussed earlier, groundwater sampling has confirmed the relatively high quality of water in the Edwards Aquifer. However, the detection of anthropogenic contaminants in some of the samples indicates the susceptibility of the aquifer to development and urbanization on the Recharge Zone and Contributing Zone (Mahler et al., 2006).

The proposed project would add a total of approximately 74 acres of impervious cover over the water quality study area. Research has shown a strong correlation between the imperviousness of a watershed and the health of its receiving streams. In a review of water quality literature, Schueler (1994) concluded that the research, conducted in many geographical areas, concentrating on many different variables, and employing widely different methods, has yielded a surprisingly similar conclusion-- stream degradation occurs at relatively low levels of imperviousness (10 to 20 percent). Past activities have resulted in the development of and changing land uses in the watersheds within the RSA. The extent of past growth is evident through an assessment of impervious cover in each watershed within the Groundwater Quality RSA in the years 1970, 1990, 2012, and 2016.[1] **Table 21** provides information about the level of development in each watershed in the Groundwater Quality RSA as indicated by the percent of impervious cover. **Figure 7** in **Attachment D** presents the extent of impervious cover mapped in the years 1970, 1990, 2012, and 2016.

As shown in **Table 21**, total impervious cover in the Groundwater Quality RSA has increased from approximately 1.9 percent in 1970 to 9.0 percent in 2016. Between 1970 and 2016, impervious cover increased by 10.8 percent within the Recharge Zone, 15.7 percent within the Transition Zone, 19.4 percent within the Contributing Zone within the Transition Zone, and 5.0 percent within the Contributing Zone of the Edwards Aquifer. Impervious cover increased between 1970 and 2016 within each of the watersheds within the Groundwater Quality RSA, with the greatest percent increase occurring in the Williamson Creek watershed where impervious cover increased from 7.0 percent in 1970 to 32.2 percent in 2016.

[1] The 1970 dataset included aerial imagery from Texas Natural Resources Information System (TNRIS) from 1970 and was supplemented with USGS data from 1973 and TNRIS data from 1974 for areas where 1970 aerial imagery was not available. The 1990 dataset included aerial imagery from TNRIS from 1990 and 1991. The 2012 dataset included aerial imagery from the USDA National Agriculture Imagery Program. The 2016 dataset included aerial imagery from Google Earth.

As the trend for growth in the Austin area continues, the trend for increased impervious cover in the watersheds in the RSA is expected to continue. The various land use plans identified in **Section 9.3** indicate that the municipalities within the RSA anticipate future development, along with the preservation of open space. As discussed earlier, the correlation between increased impervious cover and decreased surface water quality is strong. However, with current regulatory measures and future planning efforts to protect water quality, future development would be less likely to adversely affect surface and groundwater quality when compared to the past.

Table 21: Impervious Cover within the Groundwater Resource Study Area

Watershed	Contributing Zone			Recharge Zone			Transition Zone			Contributing Zone within Transition Zone			Total		
	Total Acreage	Impervious Acreage	Impervious Acreage/ Total Acreage (%)	Total Acreage	Impervious Acreage	Impervious Acreage/ Total Acreage (%)	Total Acreage	Impervious Acreage	Impervious Acreage/ Total Acreage (%)	Total Acreage	Impervious Acreage	Impervious Acreage/ Total Acreage (%)	Total Acreage	Impervious Acreage	Impervious Acreage/ Total Acreage (%)
Barton Creek															
1970	75,164	1,283	1.7%	8,132	560	6.9%	185	50	27.0%	0	0	n/a	83,481	1,893	2.3%
1990	75,164	2,974	4.0%	8,132	1,442	17.7%	185	56	30.3%	0	0	n/a	83,481	4,472	5.4%
2012	75,164	4,885	6.5%	8,132	1,860	22.9%	185	60	32.4%	0	0	n/a	83,481	6,805	8.2%
2016	75,164	5,554	7.4%	8,132	2,088	25.7%	185	67	36.2%	0	0	n/a	83,481	7,709	9.2%
Williamson Creek															
1970	4,982	339	6.8%	6,173	155	2.5%	2,710	463	17.1%	161	28	17.4%	14,026	985	7.0%
1990	4,982	584	11.7%	6,173	990	16.0%	2,710	807	29.8%	161	35	21.7%	14,026	2,416	17.2%
2012	4,982	1,133	22.7%	6,173	1,900	30.8%	2,710	920	33.9%	161	45	28.0%	14,026	3,998	28.5%
2016	4,982	1,253	25.2%	6,173	2,092	33.9%	2,710	1,115	41.1%	161	53	32.9%	14,026	4513	32.2%
Slaughter Creek															
1970	7,066	235	3.3%	7,232	41	0.6%	1,876	125	6.7%	426	5	1.2%	16,600	406	2.4%
1990	7,066	458	6.5%	7,232	411	5.7%	1,876	326	17.4%	426	76	17.8%	16,600	1,271	7.7%
2012	7,066	767	10.9%	7,232	1,371	19.0%	1,876	687	36.6%	426	167	39.2%	16,600	2,992	18.0%
2016	7,066	852	12.1%	7,232	1,577	21.8%	1,876	740	39.4%	426	181	42.5%	16,600	3350	20.2%
Bear Creek															
1970	13,027	80	0.6%	15,955	79	0.5%	2,662	71	2.7%	460	1	0.2%	32,104	231	0.7%
1990	13,027	342	2.6%	15,955	395	2.5%	2,662	257	9.7%	460	4	0.9%	32,104	998	3.1%
2012	13,027	1,307	10.0%	15,955	559	3.5%	2,662	368	13.8%	460	176	38.3%	32,104	2,410	7.5%
2016	13,027	1,508	11.6%	15,955	630	3.9%	2,662	408	15.3%	460	187	40.7%	32,104	2733	8.5%
Onion Creek															
1970	83,421	893	1.1%	19,032	88	0.5%	3,711	109	2.9%	1,890	43	2.3%	108,054	1,133	1.0%
1990	83,421	1,548	1.9%	19,032	203	1.1%	3,711	229	6.2%	1,890	176	9.3%	108,054	2,156	2.0%
2012	83,421	2,699	3.2%	19,032	559	2.9%	3,711	475	12.8%	1,890	195	10.3%	108,054	3,928	3.6%
2016	83,421	2,789	3.3%	19,032	583	3.1%	3,711	552	14.9%	1,890	231	12.2%	108,054	4,155	3.8%
Town Lake-Colorado River															
1970	0	0	n/a	33	10	29.9%	845	270	31.9%	0	0	n/a	878	280	31.9%
1990	0	0	n/a	33	13	38.9%	845	330	39.4%	0	0	n/a	878	343	39.1%
2012	0	0	n/a	33	14	42.4%	845	333	39.4%	0	0	n/a	878	347	39.5%
2016	0	0	n/a	33	16	48.5%	845	399	47.2%	0	0	n/a	878	415	47.3%
Bunton Branch-Plum Creek															
1970	0	0	n/a	0	0	n/a	2,869	91	3.2%	25	4	16.0%	2,894	95	3.3%
1990	0	0	n/a	0	0	n/a	2,869	165	5.8%	25	4	16.0%	2,894	169	5.8%
2012	0	0	n/a	0	0	n/a	2,869	219	7.6%	25	4	16.0%	2,894	223	7.7%
2016	0	0	n/a	0	0	n/a	2,869	219	7.6%	25	4	16.0%	2,894	223	7.7%
Total															
1970	183,660	2,830	1.5%	56,557	933	1.6%	14,858	1,179	7.9%	2,962	81	2.7%	258,037	5,023	1.9%
1990	183,660	5,960	3.2%	56,557	3,454	6.1%	14,858	2,170	14.6%	2,962	295	10.0%	258,037	11,825	4.6%
2012	183,660	10,791	5.9%	56,557	6,263	11.1%	14,858	3,062	20.6%	2,962	587	19.8%	258,037	20,703	8.0%
2016	183,660	11,956	6.5%	56,557	6,986	12.4%	14,858	3,506	23.6%	2,962	656	22.1%	258,037	23,104	9.0%

Source: Blanton (2014) for the years 1970, 1990, and 2012; CMEC (2017) for the 2016 data.

9.4.4 Water Quality – Surface Water

Some localized surface water and groundwater impacts would be anticipated to occur as a result of the project's construction. Increased impervious cover from the construction of the proposed roadway, in conjunction with possible induced development in the RSA, could result in some reduction in water quality over time in area watercourses. Impervious cover channels pollutants more directly into creeks without the water purification benefit provided by infiltration and overland flow across vegetated areas. Impervious cover would also have the potential to reduce recharge entering the Edwards Aquifer, which could affect sensitive species in the aquifer.

Approximately 170 linear miles of creeks flow through the Lake Austin–Town Lake watershed. Approximately 92 linear miles of creeks lie within the Williamson Creek–Onion Creek watershed and approximately 103 linear miles of creeks lie within the Slaughter Creek–Onion Creek watershed. Anticipated development within the RSA could adversely affect water quality throughout the RSA, but would be, in part, mitigated by several water quality protection regulations to be discussed in **Section 9.5**.

9.5 Step 5: Minimization and Mitigation of Cumulative Effects

Numerous mitigation measures are proposed to minimize and mitigate for potential impacts related to construction of the proposed project. **Section 8** in the Final EIS identifies mitigation and permitting (e.g. BMPs) that would be required for the implementation of the *Preferred Alternative*. In addition, a variety of land development requirements are in place at the municipal and county level that would also apply to any developer that proposed to build in the AOI.

9.5.1 Barton Springs and Austin Blind Salamander

The proposed project may affect, but is not likely to adversely affect, the Barton Springs or Austin blind salamander. The Barton Springs and Austin blind salamanders are not known to occur within the limits of the project area. Both species are known to occur within the Barton Springs segment of the Edwards Aquifer. Although no direct effects to salamanders are anticipated, indirect effects on these species due to water quality impacts are considered due to the location of the project over the Recharge Zone and due to the project's location in the Barton Springs Segment of the Edwards Aquifer. Through the use of BMPs, adherence to Edwards Aquifer rules through the preparation of a WPAP, and adherence to TPDES regulations through the preparation of a SW3P, significant indirect impacts to the Barton Springs and Austin blind salamanders are not expected as a result of the project.

Projects moving forward as a result of induced growth from the proposed project, and present or reasonably foreseeable projects (as discussed in **Section 9.3**), would be subject to regulation under the ESA if it is anticipated that they would impact either the Barton Springs or Austin blind salamanders or their habitat significantly enough to be qualified as a *take* of the species. The ESA defines *take* as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct" (ESA, 1973). The Barton Springs and Austin blind salamanders are not species listed for protection under the BCCP or the Hays County HCP. However, land set aside for the BCCP protects groundwater quality in the Barton Springs segment of the Edwards Aquifer, which indirectly benefits the salamanders. Furthermore, the City of Austin has set aside more than 26,000 acres of WQPLs specifically to protect the water quality within the Edwards Aquifer, which will also indirectly benefit and protect the Austin blind and Barton Springs salamanders. These existing protections will help to mitigate for future effects to the listed salamander species. See the discussion in **Section 9.5.2** for further information on protections in place for groundwater quality.

9.5.2 Groundwater Resources

Mitigation for potential water quality impacts occurs in the form of regulations and ordinances. Two agencies—the TCEQ and the BSEACD—share responsibility for protecting the Barton Springs segment of the Edwards Aquifer. The individual and combined effect of these regulatory programs is to protect water quality and/or mitigate the adverse effects to water quality from development activities.

TCEQ regulations to protect the Edwards Aquifer are contained in the Edwards Aquifer Rules (30 TAC 213). These rules require developers who are planning to construct on the Recharge Zone or portions of the Contributing Zone of the Edwards Aquifer to prepare and submit an aquifer protection plan to the TCEQ for review and approval. The rules require the use of permanent stormwater BMPs that remove 80 percent of the incremental increase of TSS in runoff from the site. The rules do not require the use of permanent BMPs for single-family residential development that has 20 percent or less impervious cover. Additionally, the TCEQ has issued two optional guidance documents, *Optional Enhanced Measures for the Protection of Water Quality in the Edwards Aquifer* (TCEQ, 2007a) and *Optional Enhanced Measures for the Protection of Water Quality in the Edwards Aquifer and Related Karst Features that May Be Habitat for Karst Dwelling Invertebrates* (TCEQ, 2007b). These documents provide optional enhanced water quality measures and BMPs for protecting the Edwards Aquifer that may be implemented in areas subject to the Edwards Aquifer Rules. The OEMs are consistent with the TCEQ's goal of non-degradation of groundwater quality and may be used to further protect the Edwards Aquifer, including public health and welfare, terrestrial and aquatic life, and the environment (TCEQ, 2007a; TCEQ, 2007b).

The TCEQ's TMDL Program works to improve water quality in impaired or threatened water bodies in Texas. A TMDL defines an environmental target by determining the extent to which a certain pollutant must be reduced. TMDLs are developed for surface waters that are quality-limited due to a pollutant or adverse condition. Based on the environmental target in the TMDL, the state develops an implementation plan to mitigate sources of pollution within the watershed and restore impaired uses. The Texas Water Quality Inventory and 303(d) List is an overview of the status of surface waters of the state, including concerns for public health, fitness for aquatic species and other wildlife, and specific pollutants and their possible sources. The 303(d) List, a subset of the Inventory, identifies waters that do not attain one or more standards for their use.

Water quality in wells and in the Edwards Aquifer is protected by the Safe Drinking Water Act of 1974 and the 1996 Amendments to the Act (Public Law 104-182)—laws that protect drinking water and provide source water protection. The 1996 Amendments provided new and stronger approaches to prevent contamination of drinking water, including a strong emphasis on source water protection. These rules required states to delineate source water areas of public water systems and assess the susceptibility of such source waters to contamination. The source water assessment results would then be used to implement source water protection programs. TCEQ's Source Water Protection Program (SWPP) was created by the 1996 Amendments to the Safe Drinking Water Act and set in motion a voluntary process by which local governments and suppliers of drinking water are encouraged to take proactive steps to protect local drinking water supplies before costly treatment enhancements are required. These supplies are defined primarily as water systems serving at least 15 connections or at least 25 persons at least 60 days per year.

The BSEACD, a groundwater conservation district with authority in the RSA, regulates wells within its jurisdiction, monitors the aquifer, and administers a drought management program that includes mandatory pumpage reductions based on drought stage (BSEACD, 2017a). The drought management program allows the BSEACD to maintain sustainable levels of groundwater extraction from the aquifer. Drought status is based on Barton Springs' discharge rate and water level elevation at an observation well.

The City of Austin has passed a number of watershed ordinances aimed at protecting the water supply and environmentally sensitive watersheds in the Austin area from water quality degradation. The Save Our Springs Ordinance, which was adopted in 1992, requires non-degradation and includes impervious cover limits of 15 percent for all development in the Recharge Zone, 20 percent for development in the Barton Creek portion of the Contributing Zone, and 25 percent for development in the remaining

portions of the Contributing Zone in Williamson, Slaughter, Bear, Little Bear, and Onion Creeks (COA, 2013b). The most recent City of Austin ordinance was passed in 2013; this ordinance aimed to improve creek and floodplain protection, prevent unsustainable public expense on drainage systems, simplify development regulations where possible, and minimize the ordinance's impact on the ability to develop land (COA, 2013b). Another water quality protection mechanism regulated by the City of Austin is the city's WQPL program; this program currently manages over 27,700 acres within the Contributing and Recharge Zones of the Barton Springs segment of the Edwards Aquifer. The preservation of these sensitive tracts of land will not only help preserve the quality and quantity of water entering the aquifer, it will preserve wildlife habitat and native vegetation.

Sections 404 and 401 of the Clean Water Act include provisions and responsibilities for water quality protection measures and protection of wetlands. For Section 404 permits issued by the USACE, TCEQ is authorized to certify that these permits meet the state's water quality standards. TCEQ carries out this responsibility under the Section 404 permitting program and can require the installation of temporary and permanent stormwater BMPs as part of the conditions of a Section 404 permit.

9.5.3 Surface Water

Existing regulations and programs, and BMP recommendations put forth by various agencies are set in place to promote and maintain water quality in the area. These will aid in acting as control measures for both surface waters and groundwater for future development projects within the RSA.

Surface Water Regulations

The EPA's National Pollutant Discharge Elimination System (NPDES) permit program, authorized by the CWA, controls water pollution by regulating point sources that discharge pollutants into waters of the U.S. In Texas, the NPDES program is administered by the TCEQ, as part of the TPDES. A NPDES permit may be required if wastewater is discharged into the stormwater system. The CWA established the basic structure for regulating discharges of pollutants into the waters of the U.S. In accordance with Section 404 of the CWA, the CFR defines jurisdictional waters as all waters that are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including their tributaries and adjacent wetlands (40 CFR § 230.3). This includes streams exhibiting an OHWM, their adjacent wetlands, and other water bodies exhibiting a "significant nexus" with these waters (i.e., exerting a substantial effect on the chemical, physical, and biological integrity of those waters).

Section 404 of the CWA gives the USACE authority to regulate the discharge of dredged or fill material into waters of the U.S., including wetlands. Impacts to waters of the U.S. could require USACE authorization. If a linear transportation project places less than 0.5 acre of fill into waters of the U.S., it would typically be authorized under Nationwide Permit 14 for Linear Transportation projects; impacts of 0.5 acre or more require an Individual Permit. Impacts authorized under Nationwide Permit 14 which equal or exceed 0.1 acre require Pre-Construction Notification to the USACE. Impacts to wetlands (of any amount) would also require Pre-Construction Notification. Any future development project in the RSA would be required to comply with USACE regulations.

Floodplains are lowland areas adjacent to water bodies, which are inundated during flood events. Construction within a floodplain reduces its capacity for floodwater storage and infiltration, as well as its value as habitat. Under Executive Order 11988 Floodplain Management, the FEMA requires municipalities that participate in the National Flood Insurance Program to adopt floodplain ordinances that prohibit development in existing 100-year floodplain. Coordination with the local floodplain administrator may be required for any future developments.

In order to meet minimum control measures (MCM) set by the TCEQ, any project with construction on a TxDOT system within a municipal separate storm sewer system (MS4) area needs to submit an NOI to the proper TxDOT district. Part of the Phase I MS4 area that serves the City of Austin is within the RSA. Travis County is also an MS4. TxDOT utilizes various BMPs and programs to meet these MCMs; these are listed in Table 22.

Table 22: Methods to Address Minimum Control Measures within an MS4 Area

TCEQ MCM	BMP Example	Implementation Plan
MS4 Maintenance Activities	Structural Control Maintenance	Inspect structural controls at least once per year. Schedule follow-up actions as necessary.
Post-construction Storm Water Control Measures	Permanent Structure	Inspect permanent structure control.
Illicit Discharge Detection and Elimination	Update Storm Sewer Outfall Map	Map and screen all outfalls in MS4 areas.
Pollution Prevention and Good Housekeeping	Waste Handling	Ensure proper disposal of litter and debris removed from roadways by litter collection and/or street sweeping. Ensure proper disposal of spoil materials removed during maintenance of drainage ditches and structural controls.
Construction Site and Storm Water Runoff	Compliance with the Construction General Permit (CGP)	Develop and implement plan to ensure compliance, and require contractors to comply with the CGP.

Table 22: Methods to Address Minimum Control Measures within an MS4 Area		
TCEQ MCM	BMP Example	Implementation Plan
Public Education, Outreach, Involvement and Participation	Don't Mess with Texas Programs	Continue Don't Mess with Texas programs, which may include Adopt-a-Highway, Campus Cleanup, Road Touch, and trash-off efforts.
Monitoring and Screening Programs	Dry Weather Screening/Wet Weather Monitoring	Utilize Advanced Outfall Tracking System. Perform representative monitoring event or participate in Regional Surfacewater Monitoring Program.

Source: TxDOT, 2017.

BMP Recommendations

The proposed Oak Hill Parkway project would strictly adhere to the TCEQ standards for BMPs over the Edwards Aquifer and would commit to removing 80 percent of the incremental increase in TSS that results from the project's additions of impervious cover in the Edwards Aquifer Recharge Zone. Numerous other structural and non-structural BMPs are proposed for the current project and detailed in Section 8 of the Final EIS.

According to the analysis summarized in **Table 21**, based on 2016 aerial imagery, approximately 23,104 acres of impervious cover, or 9.0 percent, exist in the groundwater RSA. Development by others may be proposed within the RSA.

TCEQ has several accepted permanent BMPs that reduce the effects that vegetation removal can have on the environment:

- Vegetative Filter Strips – Vegetated sections of land with low slopes designed to accept runoff as overland sheet flow.
- Grassy Swales – Vegetated channels that convey stormwater and remove pollutants by filtration through grass and infiltration through soil.

TxDOT has created vegetation management guidelines (TxDOT, 2013) in order to enhance environmental protections and mitigate erosion. Two levels of management are recommended for urban versus rural roadways, but additional measures are recommended for special circumstances, such as special habitat or threatened and endangered species. All recommendations from those guidelines would be followed along current and future TxDOT roadways in the RSA, including mowing restrictions, adding trees and shrubs along the right-of-way, and encouraging seed production.

TCEQ lists additional BMPs for construction and post-construction phases that future development projects would be required to consider. With implementation of the various BMPs, and anticipated compliance with requirements set by the numerous authorities that govern the areas within the RSA, it is unlikely that the proposed Oak

Hill Parkway project would contribute to substantial adverse cumulative effects to water quality.

Various Municipal Codes Including Land Development Regulations

As discussed in **Section 4** of this addendum, proposed developments would be subject to various municipal land development codes that require environmental investigations or impose development restrictions such as impervious cover limits, in addition to county, state, and federal regulations that may apply.

10. Cumulative Impacts Conclusions

This analysis considered Austin blind and Barton Springs salamanders, and their habitats, in addition to groundwater and surface water resources; discussed the health of these resources and relevant trends; and identified specific RSA boundaries and appropriate temporal boundaries for the analysis. Direct and potential indirect impacts were summarized for each sensitive resource. Past, present, and reasonably foreseeable future actions were identified through research, interviews, and cartographic analysis. The construction of the proposed project was considered in conjunction with these other actions to consider cumulative impacts. This analysis provided detailed information about sensitive resources within the RSAs for the US 290/ SH 71 Oak Hill Parkway Project and described the extensive controls that have evolved over time to help protect these resources.

Minimization of impacts to sensitive resources would be achieved through specific design measures and BMPs implemented for the proposed project, and similar requirements would be applicable to developers throughout a large portion of the RSAs, especially where construction is proposed over the Recharge and Contributing Zones of the Edwards Aquifer. Mitigation measures are required for impacts to endangered species habitat, and there are HCPs in place in Hays County and Travis County (along with the City of Austin) that provide a framework in which developers can comply with the ESA. The larger municipalities with jurisdiction within the RSA all have land development code requirements and plans for their future land use and transportation networks that generally reflect a common commitment to sustainable development. The conservation entities charged with protecting endangered species and sensitive resources have plans in place to continue to protect sensitive habitats. A large portion of land within the RSAs would be protected in perpetuity through conservation easements or WQPLs specifically acquired for that purpose.

Direct impacts that would be caused by the proposed project would be limited in part by the implementation of extensive BMPs before, during, and after construction. Given the conservation initiatives underway within the RSAs and the incremental contribution

the proposed project would make toward induced development in the AOI, within the context of the continuing development trends, the proposed project is not anticipated to result in substantial adverse indirect impacts to sensitive resources. The proposed project may incrementally contribute to cumulative effects on water quality and threatened and endangered species, but project impacts would not act as a tipping point to significantly affect the overall health of these resources. Neither water quality nor threatened and endangered species are expected to be significantly affected by the combination of the project with other past, present, and reasonably foreseeable future actions.

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Attachment A
Indirect Impacts Figures

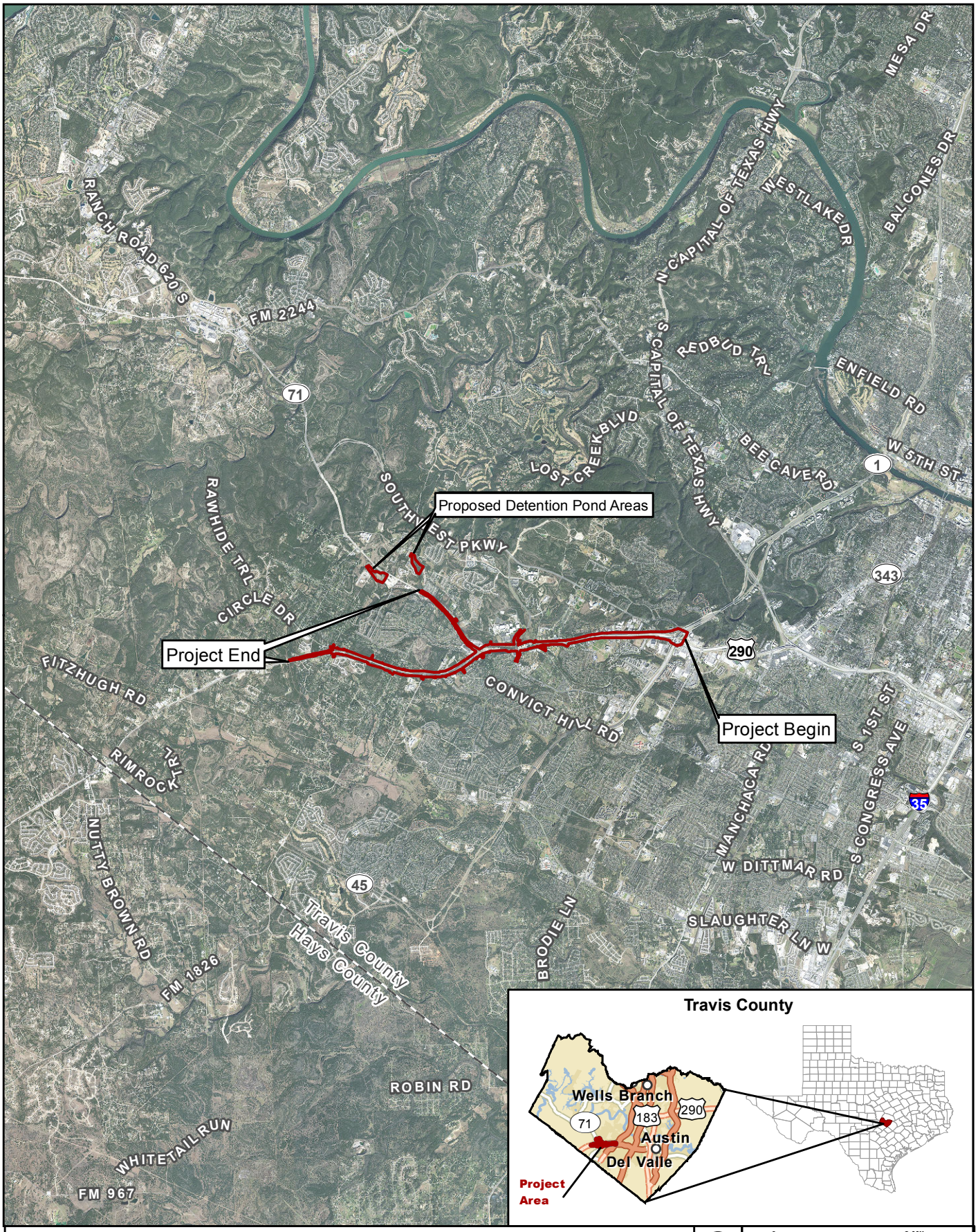

Figure 1. **Project Location (Aerial Base)**

Oak Hill Parkway: US 290W from Mopac/Loop1 to west of Circle Drive and SH 71 from US 290W to Silvermine Drive

Project Location

Basemap Source: TNRIS (2015)

0 2 Miles
0 3 Kilometers

Prepared for: TxDOT	1 in = 2 miles
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CSJ: 0013-08-060 and 0700-03-077	Date: 12/6/2016

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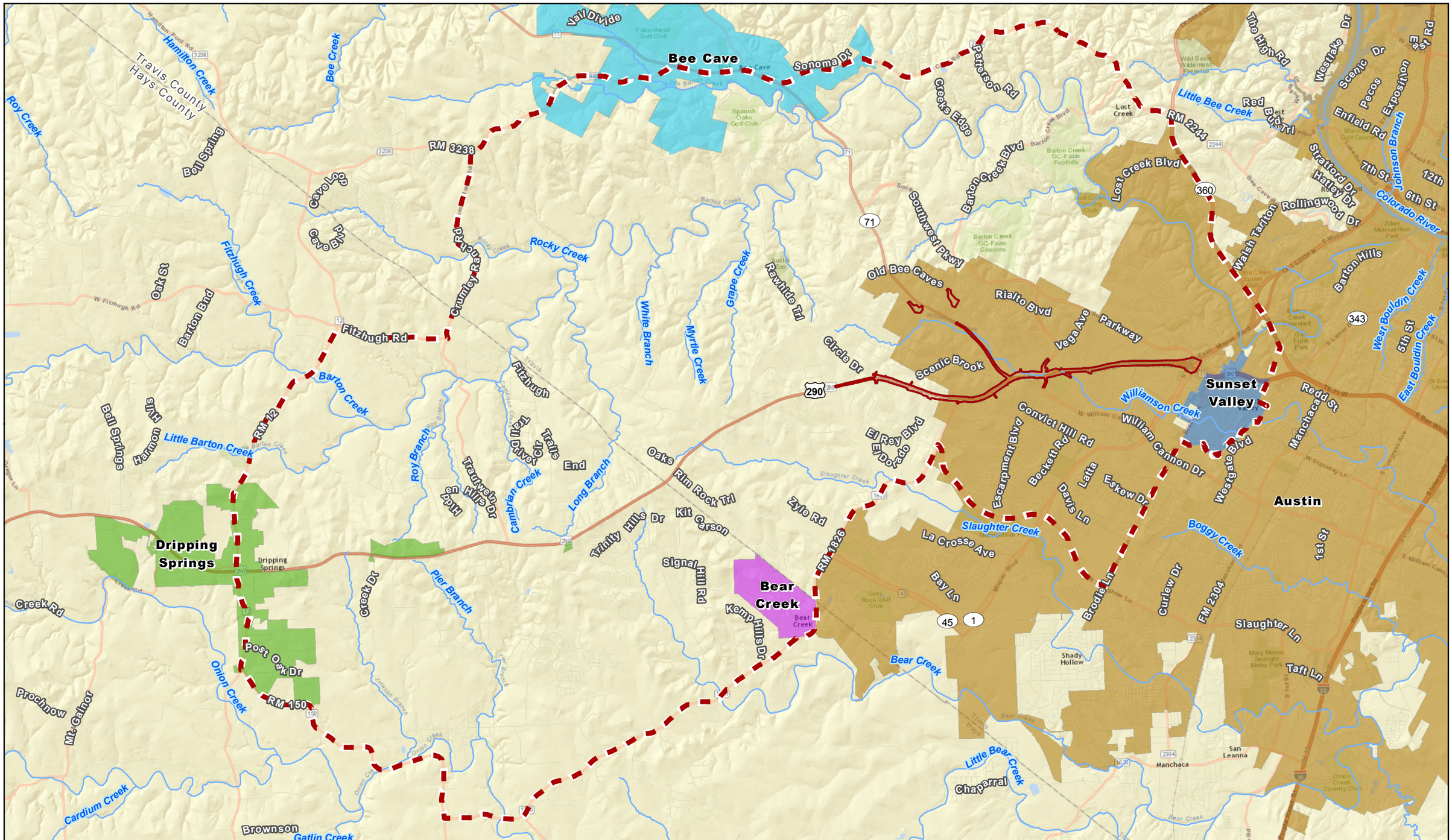

Figure 2. Area of Influence

Oak Hill Parkway: US 290W from Mopac/Loop1 to west of Circle Drive and SH 71 from US 290W to Silvermine Drive

Data Sources: TNRIS (2016), City of Austin (2016), NHD (2014)
Basemap Source: ESRI (2016)

Prepared for: TxDOT	1 in = 1.5 mile
	Scale: 1:95,040
CSJ: 0013-08-060 and 0700-03-077	Date: 10/28/2016

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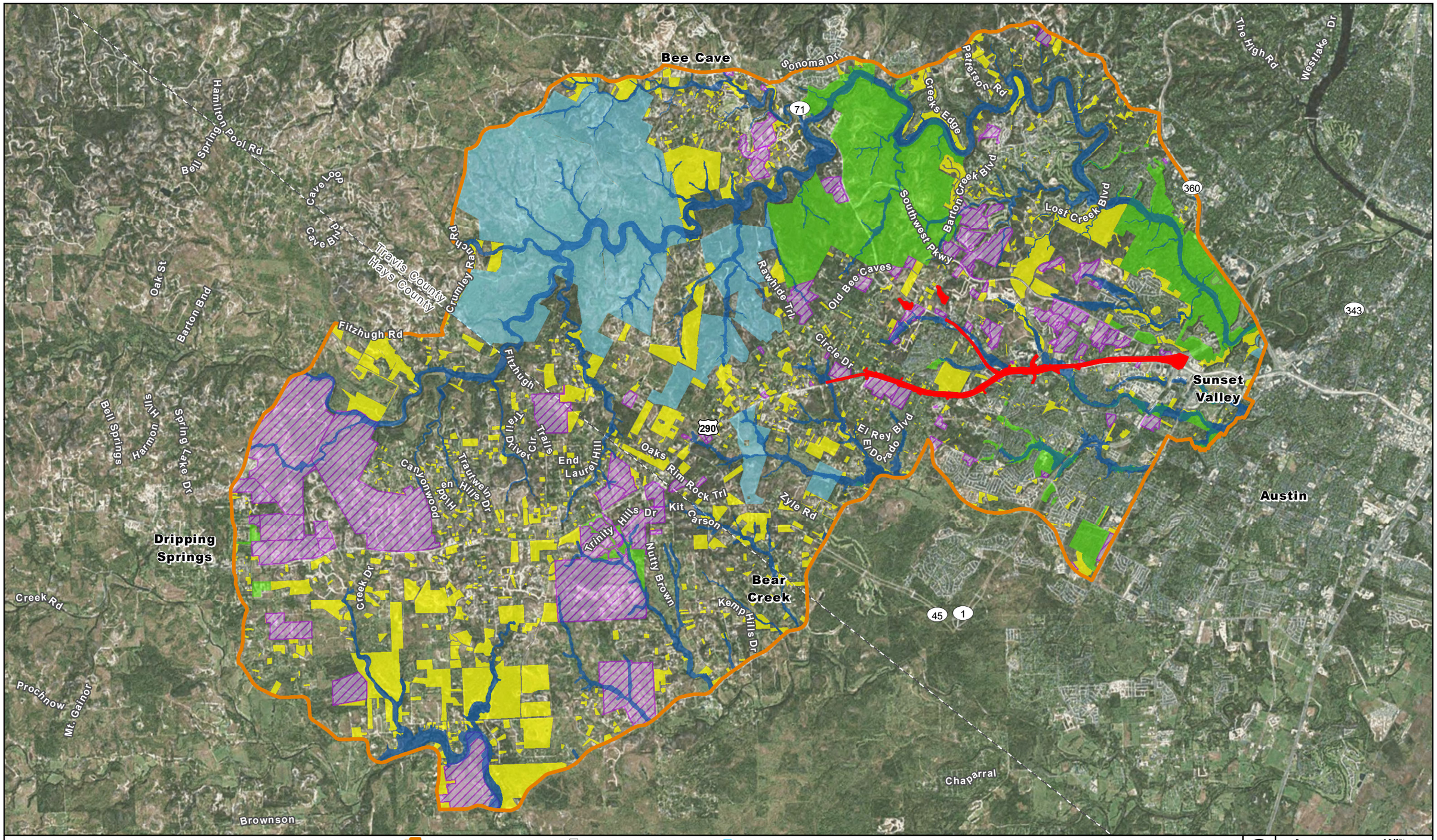

Figure 3. Developable Land within the AOI

Oak Hill Parkway: US 290W from Mopac/Loop1 to west of Circle Drive and SH 71 from US 290W to Silvermine Drive

- Area of Influence (AOI)
- Project Location
- Developable Land
- Developed Land
- Planned Development
- Park
- Water Quality Protection Land
- 100-Year Floodplain

Data Sources: CAPCOG (2016), City of Austin (2013, 2016), City of Bee Cave (2016), City of Dripping Springs (2016), CMEC (2016), FEMA NFHL (2015)
Basemap Source: ESRI (2015)

0 1.5 Mile
0 2 Kilometers

Prepared for: TxDOT	1 in = 1.5 miles
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CSJ: 0013-08-060 and 0700-03-077	Date: 3/10/2017

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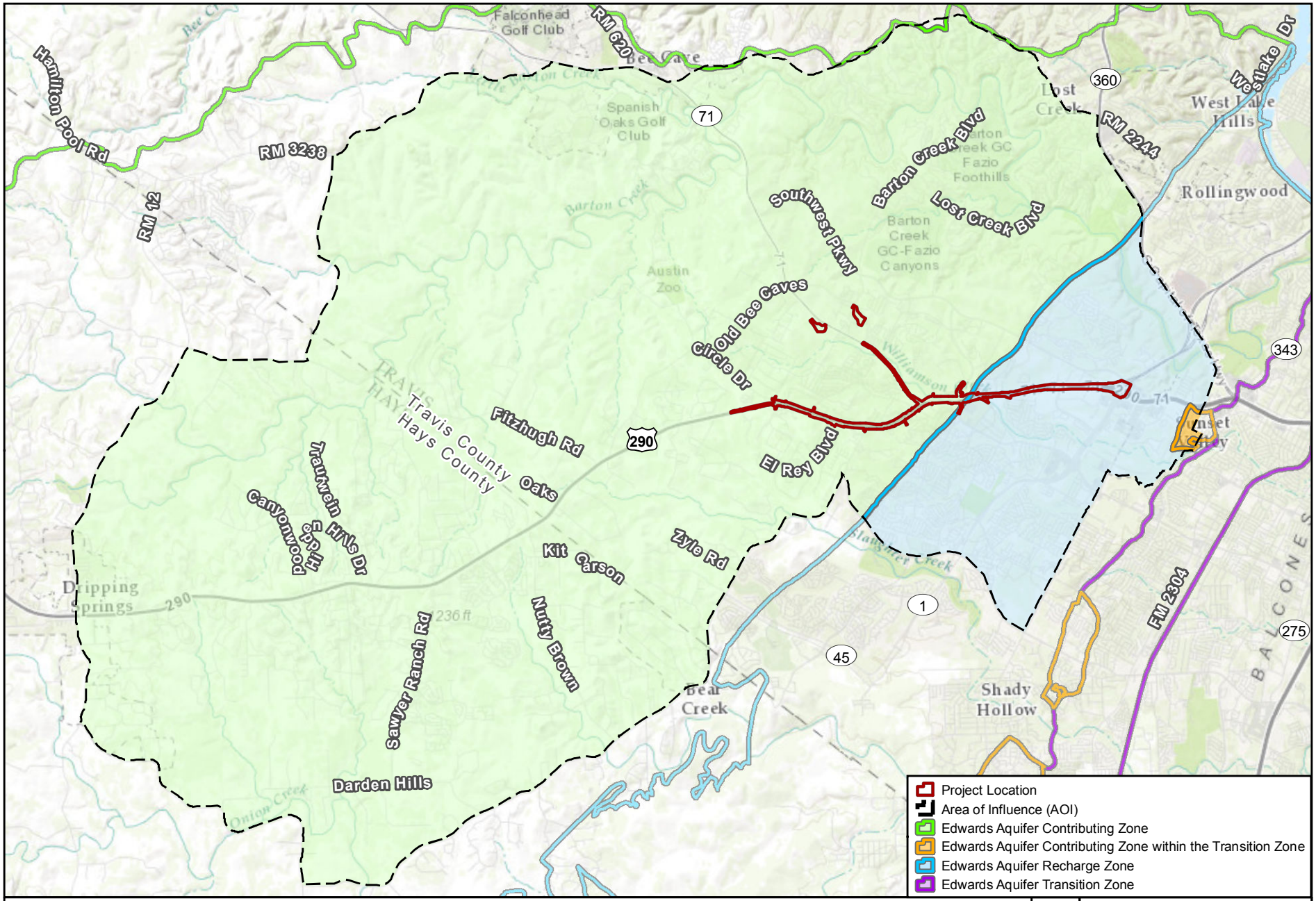

Figure 4. Aquifer Zones within the AOI

Oak Hill Parkway: US 290W from Mopac/Loop1 to west of Circle Drive and SH 71 from US 290W to Silvermine Drive

Data Source: TCEQ (2005)
Basemap Source: ESRI (2017)

Prepared for: TxDOT	1 in = 2 miles
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CSJ: 0013-08-060 and 0700-03-077	Date: 3/10/2017

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Attachment B
City of Austin Emerging Development Projects

CITY OF AUSTIN	
Project Name	Acres
9710 Shallowford	4.4
ACE Hardwood	5.0
Addison Grove	26.1
All Saints Presbyterian Church	6.6
Amarra	365.9
Austin Seventy-One	30.9
Aviara	39.5
Barton Creek Office Park	13.6
Barton Creek Section N Multi-Family	27.5
Blackstone Vineyard	209.3
Bowie High School Practice Fields	4.0
Breakwater Subdivision	26.9
Broadstone Scenic Brook	46.3
Brodie 31 PUD	31.8
Calvert House	6.3
Circle C Apartments	14.5
Circle C Ranch Tract 2B	12.2
Collings Guitars Phase II	2.4
Cottages of Lantana	8.8
Covered Bridge PUD	63.2
CR-163 Subdivision	60.6
Davis Lane Garden Homes	1.4
Edelmon Estates	7.0
Encino Trace	54.1
Escondera Section 4	6.6
Fox Hill Apartments	44.8
Garcia's PP&M Subdivision	3.0
Harper Park	17.8
Harper Park Hotel Tract	3.3
Landmark Conservancy	20.2
Lantana	8.8
Lantana Tract 28	28.2
Lantana Tract 32	46.7
Lantana Tract 33	27.5
Live Oak Trail	8.6
LOCO-Motion Inflatable Play, LLC	1.3
Lone Star Bank	9.9
Lost Creek	1.4
Marx Property Fill and Drainage Improvements Plan	15.6
Nutty Brown Business Park	7.9
Oak Hill Emergency Center	1.0
Oakhill Medical Center	13.3
Old Bee Cave Rd. Subdivision	10.5
Old Bee Caves Office Building	1.0

CITY OF AUSTIN	
Project Name	Acres
Old Bee Caves Road Condos	20.2
Overlook Estates	126.3
Overwatch Phase 2	45.8
Preserve at Thomas Springs Road, The	38.5
Rancho Garza Preliminary Plan	35.7
Regency Park	3.2
Regents West Campus	11.2
Ridgeview	93.0
Seton Southwest Expansion	0.6
Seven Oaks Office Park	28.0
Southwest Parkway Office Building	9.0
Spanish Oaks Sec 7 PP	59.8
Spanish Oaks Sec XI PP	51.2
St. Andrew's School Miller Tract	92.8
St. Gabriel's Catholic School, Building B	31.4
Stoneridge	2.7
Sunset Ridge	9.8
Travis County MUD 4 South Wastewater Treatment Plant	36.3
Travis County MUD No. 4 Barton Creek Section N Regional Stormwater Mgmt. Wet Pond	10.2
Trinity Place Apartments	24.5
Vega Office	4.6
Villas of Barton Ridge Estates Section II	40.4
Waterleaf Medical At Davis Lane-Autumn Leaves of Southwest Austin	6.0
Western Oaks Retail Center	15.4

Attachment C
Indirect Impacts Analysis Questionnaire

OAK HILL
PARKWAY

Dear Planning Expert:

The Texas Department of Transportation (TxDOT) and the Central Texas Mobility Authority are proposing improvements to U.S. Highway 290 (US 290)/State Highway (SH) 71 West from State Loop 1 (MoPAC) to Ranch-to-Market (RM) 1826 and SH 71 to Silvermine Drive.

The purpose of the proposed project is to improve mobility and operational efficiency, facilitate long-term congestion management in the corridor by accommodating the movement of people and goods for multiple modes of travel, and improve safety and emergency response within the corridor. Under TxDOT guidance, the potential "indirect and cumulative" effects of the project must be addressed. To aid in assessing the potential direct, indirect, and cumulative impacts of the project we are contacting your agency/organization to obtain your insight on how the project may affect your community or the region.

We have attached a map of the project area with the proposed roadway shown along with our proposed Area of Influence (AOI) for indirect effects analysis. Guidance from TxDOT requires that we assess potential indirect and cumulative effects out to the planning horizon, which has been established as 2040 in conjunction with the Capital Area Metropolitan Planning Organization's Regional Transportation Plan. A key component of this requirement is determining whether or not a project will have indirect effects such as induced growth and land use development. We are seeking to identify any areas where potential development could occur (whether or not it is currently planned) within the planning horizon that could be attributed at least in part to the proposed project.

Please complete the following questionnaire to the best of your knowledge; if you are not the best person to answer the questions, please forward this to the appropriate person or persons within your organization. Please return your answers to the following address (electronic responses are welcomed with legible marked up maps) by **November 18th, 2016**:

US 290 Oak Hill Parkway
Attn: Erin Grushon
Cox|McLain Environmental Consulting
6010 Balcones Drive #210
Austin, TX 78731

We recognize that the people who are most knowledgeable about how projects might affect a community are the local experts. We appreciate your time and input in this process.

OAK HILL
PARKWAY

Oak Hill Parkway Indirect Impacts Questionnaire

Respondent Information

Name: _____ Email: _____

Title: _____ Phone: _____

Agency: _____

Questions

1. Are you aware of any substantial proposed land developments within your jurisdiction or area? If so, please mark the areas on the attached map and provide the location, type, and size (e.g. acres, density, number of units) of any planned developments. Also, please indicate if any of the proposed land developments that you identified on the attached map have been platted.

2. On the attached map, please identify parcels (if any) that you think would likely be developed by 2040[1] as a result of the proposed project that would not otherwise be developed. *(Please distinguish from developments identified in question 1)*.

3. Would the proposed project affect the rate of land development in your jurisdiction?

4. Is the proposed project consistent with local planning efforts (i.e. master or comprehensive plans, growth management plans, zoning or land use policies, etc)?

[1] 2040 is the horizon year for the CAMPO 2040 Plan, which is inclusive of the 2039 horizon year for the City of Austin's *Imagine Austin* Comprehensive Plan.

OAK HILL
PARKWAY

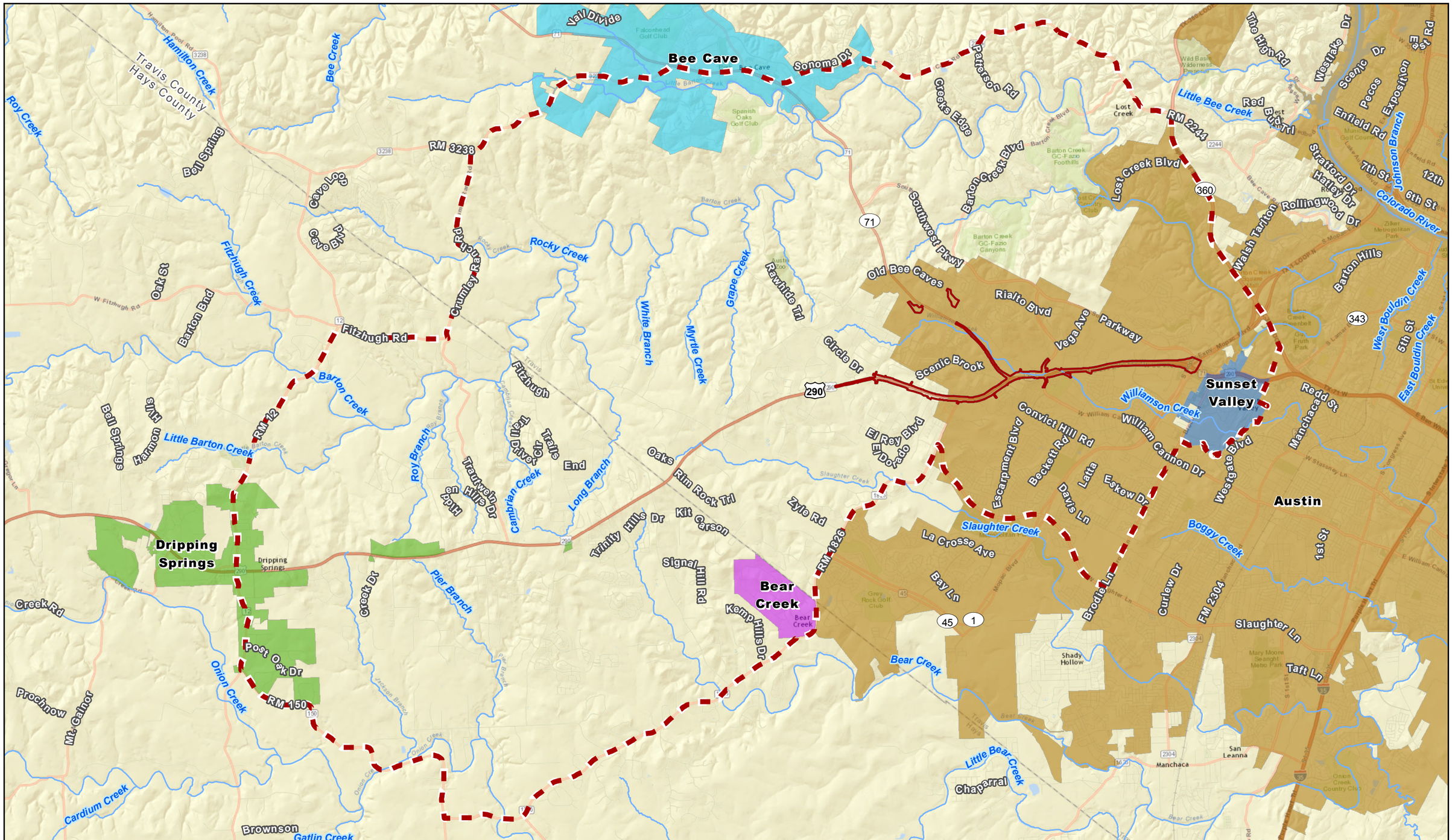
5. Are there other capital improvement projects – such as water or sewer infrastructure, school or hospital construction – that are planned for the area which might affect development in the project vicinity?

6. Are there any factors that could limit growth in the area, such as floodplains, current development, conservation easements, protected lands, etc?

7. How would the proposed project be expected to impact travel patterns in the area? Which roadways would benefit from the proposed project? How do people in the project area get to Austin now?

8. What type of traffic would you anticipate to use this facility (i.e. local traffic, regional commuters, through traffic)?

9. Do you have any comments on the proposed Area of Influence or do you think it is a reasonable study area for an assessment of indirect impacts that may result from the proposed project?



Proposed AOI

Oak Hill Parkway: US 290W from Mopac/Loop1 to west of Circle Drive and SH 71 from US 290W to Silvermine Drive

Project Location
AOI
NHD Stream

Jurisdictional Boundaries

AUSTIN FULL PURPOSE
BEAR CREEK FULL PURPOSE
BEE CAVE FULL PURPOSE
DRIPPING SPRINGS FULL PURPOSE
SUNSET VALLEY FULL PURPOSE

Data Sources: TNRIS (2016), City of Austin (2016), NHD (2014)
Basemap Source: ESRI (2016)

0 1.5 Mile
0 2 Kilometers

Prepared for: TxDOT	1 in = 1.5 mile
	Scale: 1:95,040
CSJ: 0013-08-060 and 0700-03-077	Date: 10/28/2016

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Attachment D
Cumulative Impacts Figures

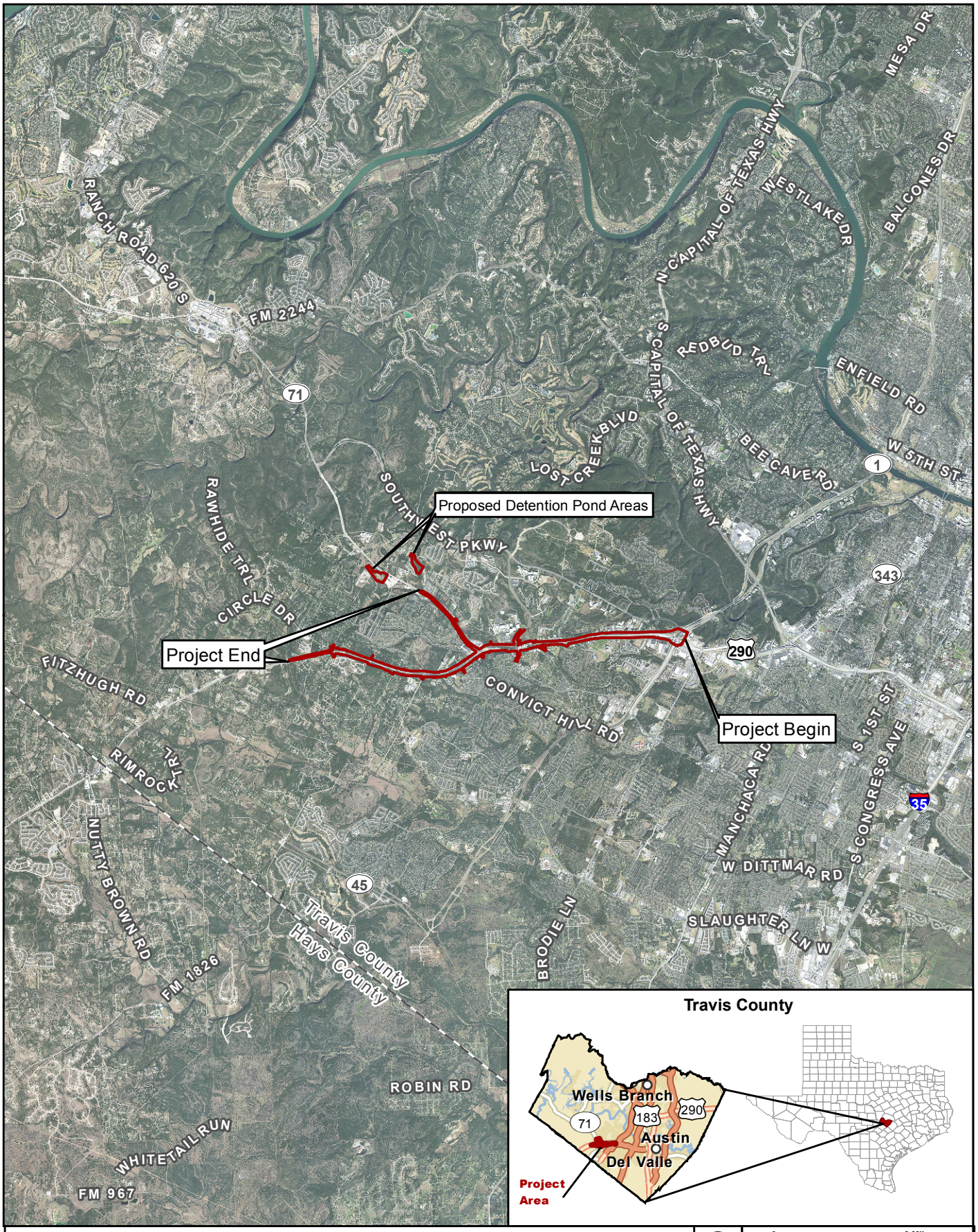

Figure 1. **Project Location (Aerial Base)**

Oak Hill Parkway: US 290W from Mopac/Loop1 to west of Circle Drive and SH 71 from US 290W to Silvermine Drive

Project Location

Basemap Source: TNRIS (2015)

0 2 Miles
0 3 Kilometers

Prepared for: TxDOT	1 in = 2 miles
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CSJ: 0013-08-060 and 0700-03-077	Date: 12/6/2016

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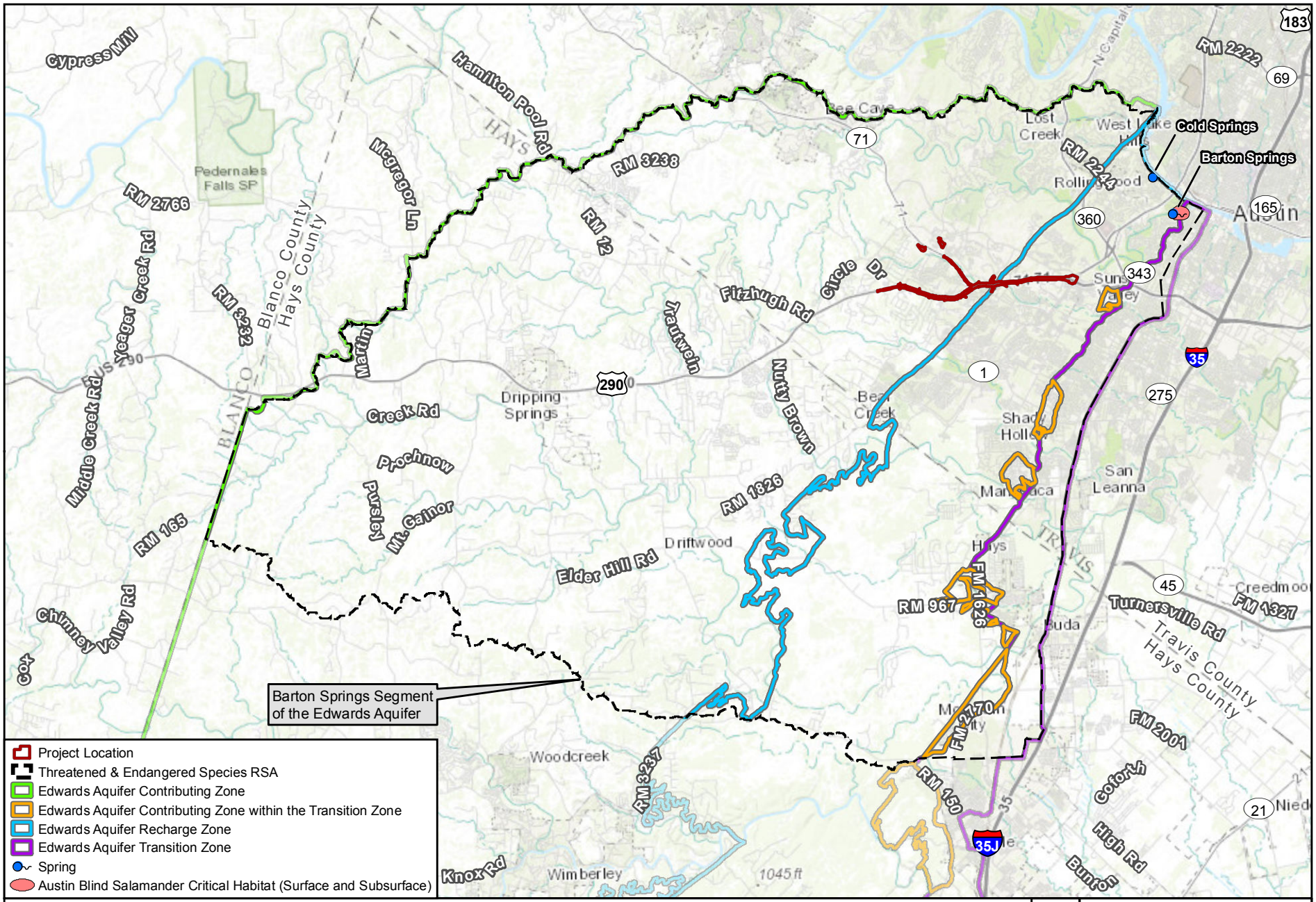

Figure 2. Federally-Listed Threatened and Endangered Species RSA

Oak Hill Parkway: US 290W from Mopac/Loop1 to west of Circle Drive and SH 71 from US 290W to Silvermine Drive

Data Source: TCEQ (2005), USFWS (2013)
Basemap Source: ESRI (2017)

Prepared for: TxDOT	1 in = 4 miles
	Scale: 1:253,440
CSJ: 0013-08-060 and 0700-03-077	Date: 2/17/2017

G:\Projects\TXDOT\US290\ICI_Figure 2_T&E RSA_BSEA_20170214.mxd

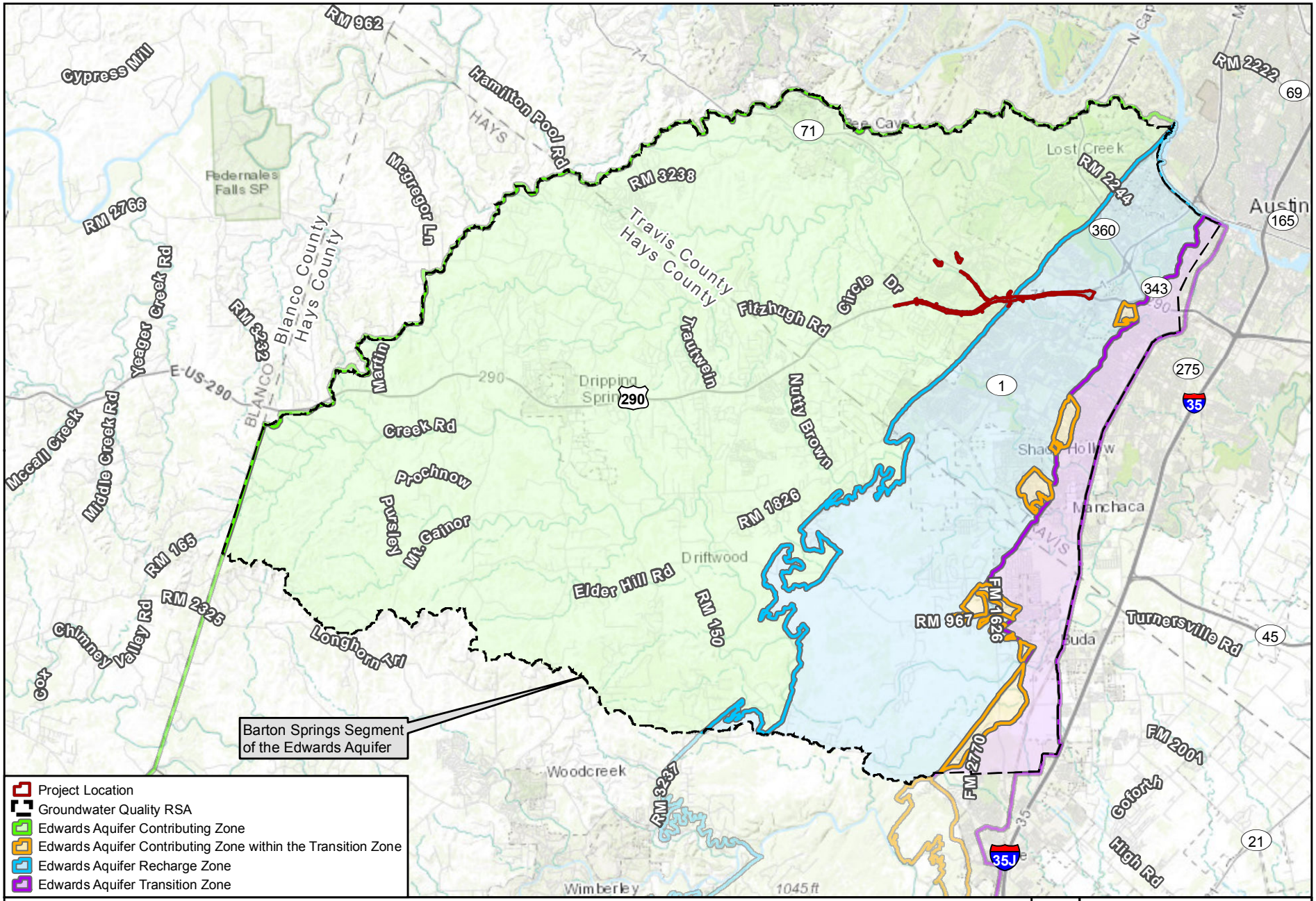

Figure 3. Groundwater Quality RSA

Oak Hill Parkway: US 290W from Mopac/Loop1 to west of Circle Drive and SH 71 from US 290W to Silvermine Drive

Data Source: TCEQ (2005)
Basemap Source: ESRI (2017)

Prepared for: TxDOT	1 in = 4 miles
	Scale: 1:253,440
CSJ: 0013-08-060 and 0700-03-077	Date: 3/9/2017

G:\Projects\TXDOT\US290\ICI_Figure 3_GroundWaterQual_RSA_20170217.mxd

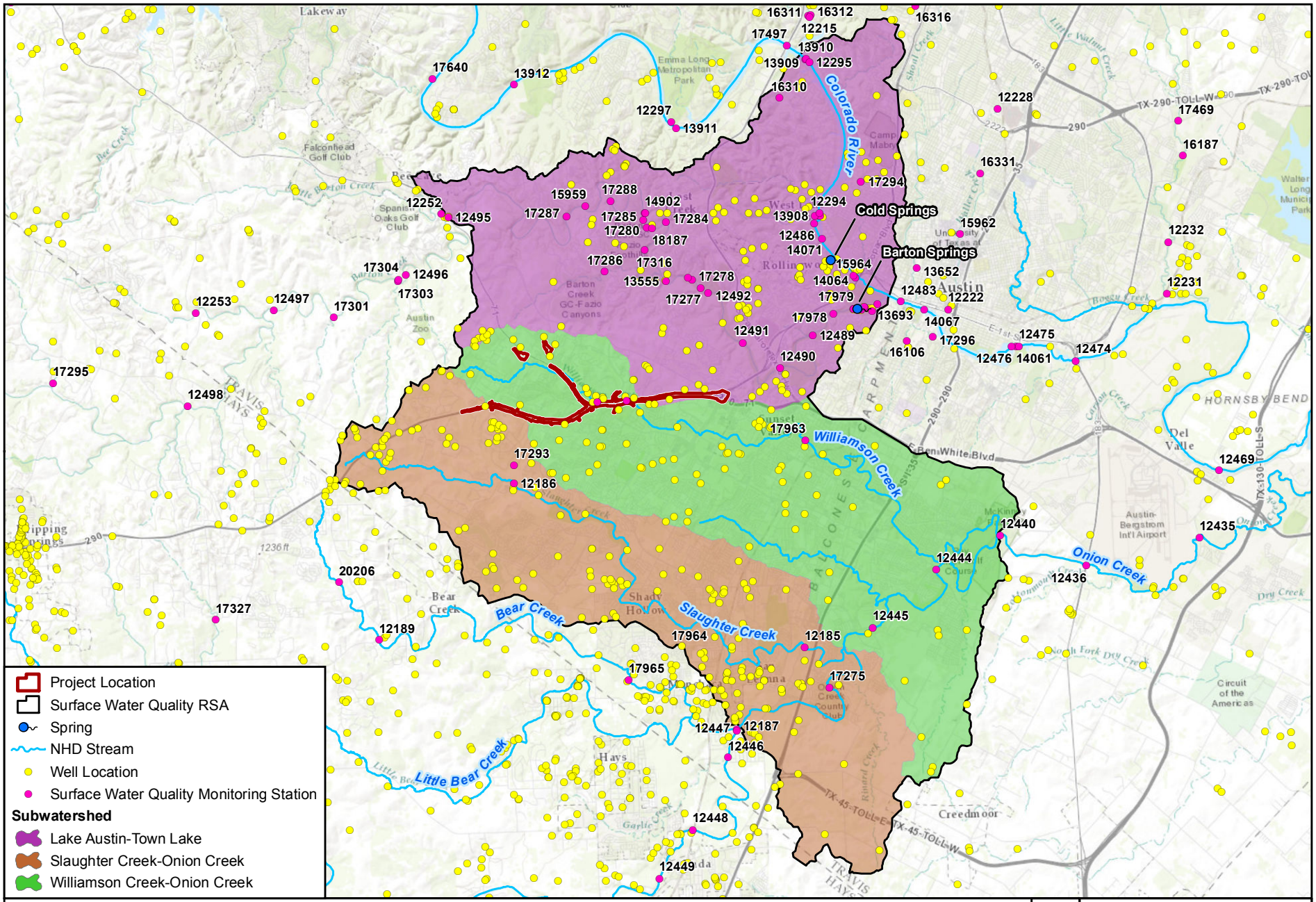

Figure 4. Surface Water Quality RSA

Oak Hill Parkway: US 290W from Mopac/Loop1 to west of Circle Drive and SH 71 from US 290W to Silvermine Drive

Data Sources: COA (2016), TCEQ (2017), NHD (2014), TWDB (2017), Basemap Source: ESRI (2017)

0 3 Miles
0 5 Kilometers

Prepared for: TxDOT	1 in = 3 miles
	Scale: 1:190,080
CSJ: 0013-08-060 and 0700-03-077	Date: 3/9/2017

G:\Projects\TXDOT\US290\ICI_Figure 4_SurfaceWaterQual_RSA_20170217.mxd

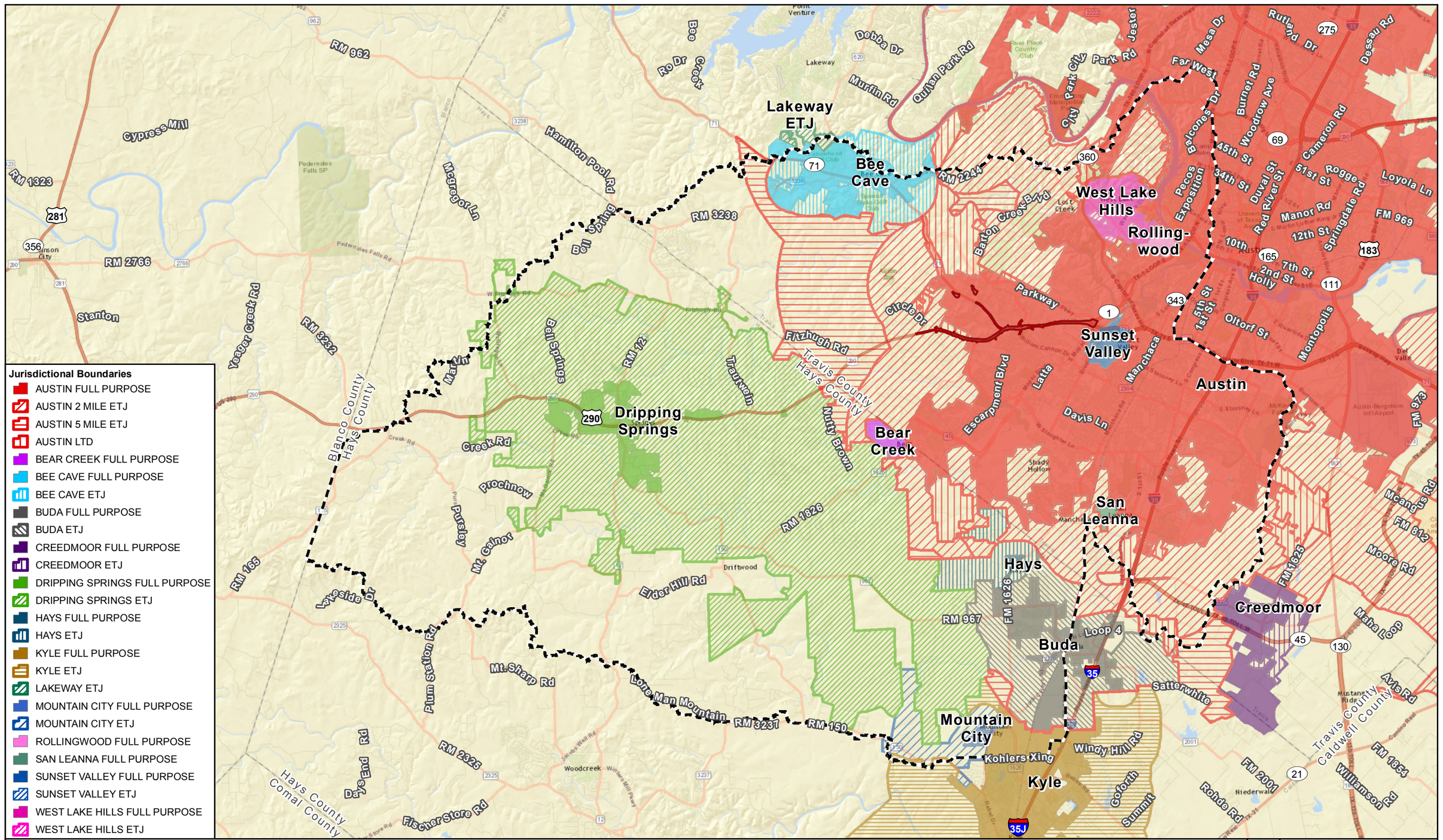

Figure 5. Combined RSA

Oak Hill Parkway: US 290W from Mopac/Loop1 to west of Circle Drive and SH 71 from US 290W to Silvermine Drive

Data Sources: CMEC (2016), City of Austin (2016)
Basemap Source: ESRI (2017)

G:\Projects\TXDOT\US290\ICI_Figure 5_Combined_RSA_20170214.mxd

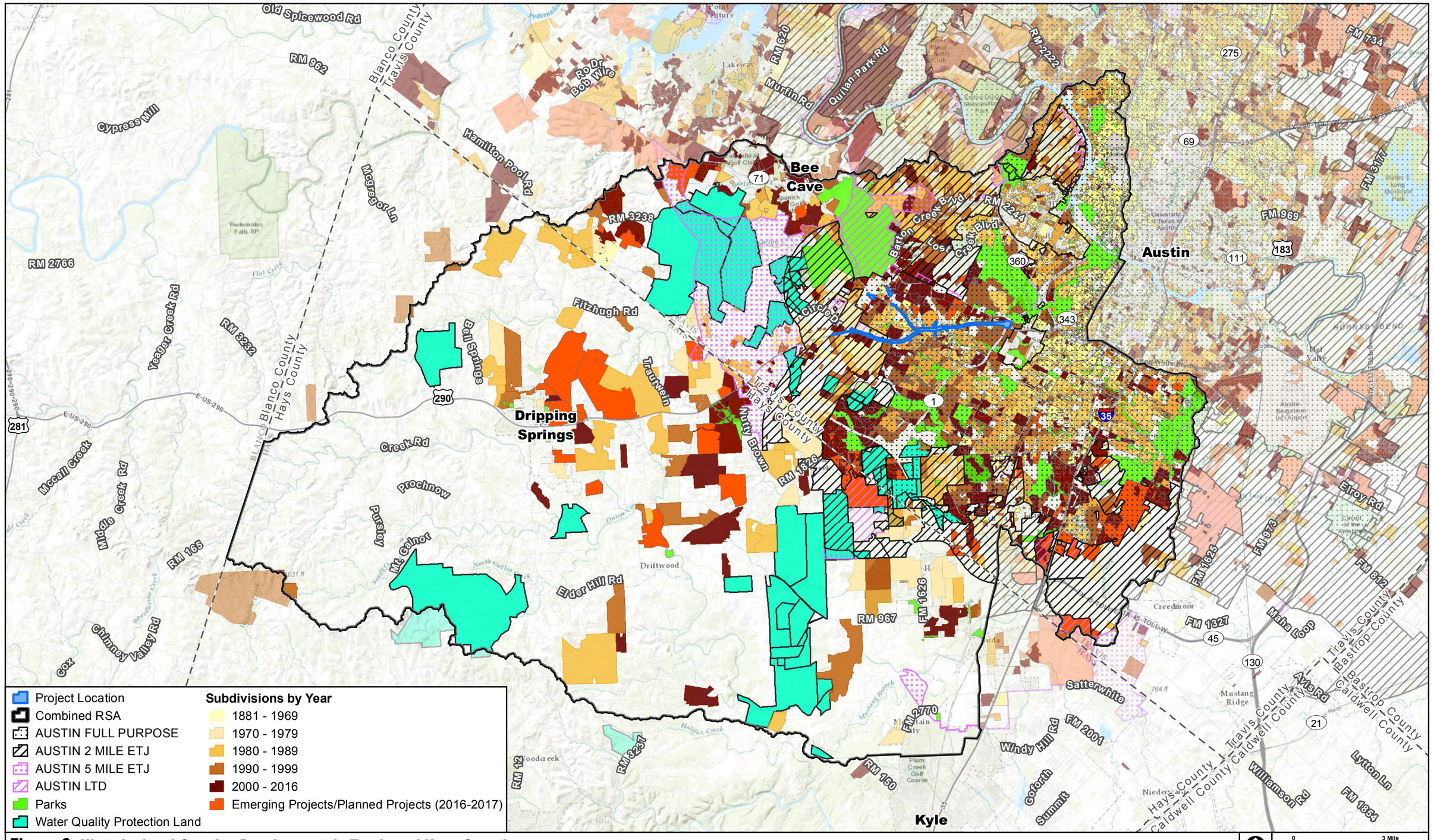

Figure 6. Historical and Ongoing Development in Travis and Hays Counties

Oak Hill Parkway: US 290W from Mopac/Loop1 to west of Circle Drive and SH 71 from US 290W to Silvermine Drive

Data Source: CAPGOG (2016), City of Austin (2013, 2016), City of Bee Cave (2016), City of Dripping Springs (2016), TCAD (2017)
Basemap Source: ESRI (2017)

0 3 Mile
0 5 Kilometers

Prepared for: TxDOT	1 in = 3 miles
	Scale: 1:190,080
CSJ: 0013-08-060 and 0700-03-077	Date: 3/10/2017

G:\Projects\TXDOT\US290\ICI_Figure 6_Historical_Ongoing_Dev_20170217.mxd

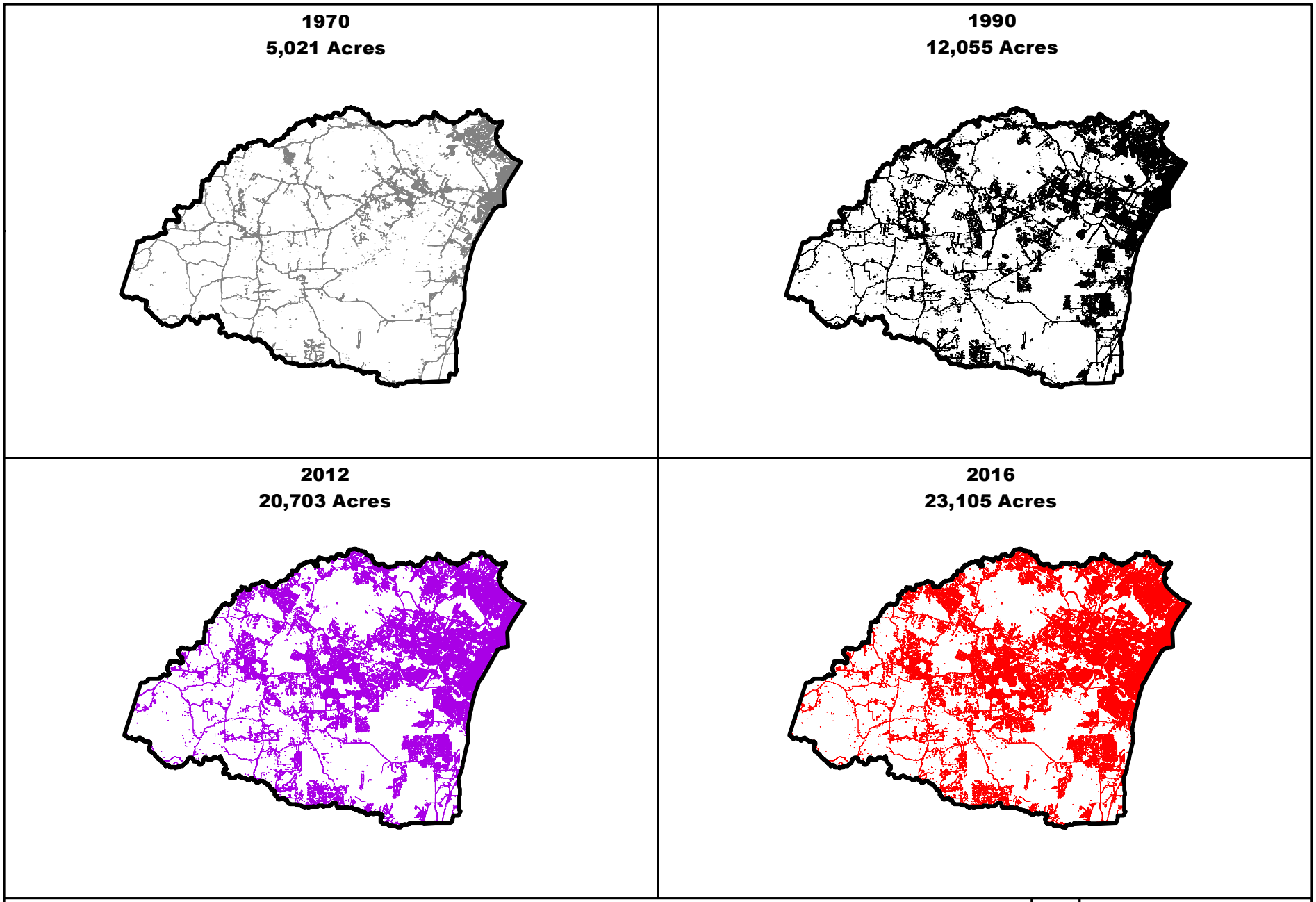

Figure 7. Impervious Cover within Groundwater RSA

Oak Hill Parkway: US 290W from Mopac/Loop1 to west of Circle Drive and SH 71 from US 290W to Silvermine Drive

Groundwater Quality RSA
1970 Impervious Cover
1990 Impervious Cover
2012 Impervious Cover
2016 Impervious Cover

Data Source: Blanton (2012), CMEC (2017)

0 10 Miles
0 16 Kilometers

Prepared for: TxDOT	1 in = 10 miles
	Scale: 1:633,574
CSJ: 0013-08-060 and 0700-03-077	Date: 3/10/2017

G:\Projects\TXDOT\US290\ICI_Figure 7_Impervious_Panel_20170310.mxd

Attachment E
Past, Present, and Reasonably Foreseeable Future Projects

Attachment E-1

Subdivision Developments in Hays County

E-1: Past Subdivision Developments in Hays County							
Name	**Lots**	**Acres**	**Year Platted**	**Name**	**Lots**	**Acres**	**Year Platted**
North Forty	121	41	1973	Bell Springs Ranches	43	635	1991
Douglas Estates	51	435	1973	Triple Creek Ranch	56	135	1994
Chaparral Park	200	240	1973	Madrone Ranch	47	302	1994
Big Country	140	258	1974	Polo Club	93	152	1995
Oxbow Trails	78	174	1975	Ruby Ranch	177	1097	1995
Leisurewoods	300	352	1977	Vista Grande	49	230	1997
Hays County Oaks	360	871	1977	Creek of Driftwood	75	74	1997
Bear Creek Oaks	120	687	1977	Woodland Estates	58	127	1997
Heritage Oaks	233	556	1978	Onion Creek Ranch	76	423	1997
Cimmaron Park	328	194	1978	Bradfield Village	214	80	1998
Southwest Territory	105	124	1978	Creekside Park	170	83	1998
Oak Springs	47	155	1978	Ashford Park	115	37	1998
Mountain City Oaks	320	207	1978	Hidden Springs Ranch	50	174	1999
Bear Creek Estates Sec 2	52	221	1979	Sawyer Ranch	48	280	1999
Allegre Monantial	43	61	1979	La Ventana	583	585	1999
Sequoyah	200	80	1980	Copper Hills	49	61	1999
Goldenwood	105	389	1981	Springlake	180	686	1999
Rainbow Ranch	104	1722	1981	Elliot Ranch	112	546	1999
Bonita Vista	144	65	1982	Sierra West	99	382	2000
Sunset Canyon	1175	1742	1983	Arroyo Ranch	129	142	2001
Barton Creek Ranch	96	283	1983	The Preserve	49	244	2001
Goldenwood West	98	218	1983	Belterra	500	991	2002
Saddletree Ranch	117	412	1984	Cullen Country	210	62	2003
Oak Run West	46	135	1984	Rim Rock	545	755	2003

E-1: Past Subdivision Developments in Hays County							
Name	**Lots**	**Acres**	**Year Platted**	**Name**	**Lots**	**Acres**	**Year Platted**
Heritage Country	50	281	1984	Stoneridge	293	36	2004
Westcave Estates	320	270	1984	Meadow Park	100	44	2004
Hills of Texas Estates	120	153	1984	Whispering Hollow	128	222	2004
Coves of Cimmaron	270	177	1984	Highpointe	217	739	2005
Hills of Texas	120	39	1984	Howard Ranch	57	139	2005
Crosshouse	75	189	1985	Meadows at Buda	110	95	2005
Oak Forest	135	373	1985	Preserve at La Ventana	49	126	2005
Meadow Oaks	120	85	1985	Reunion Ranch	128	149	2005
Friendship Ranch	98	471	1986	Rutherford West	58	111	2005
Harmon Hills	63	382	1986	Bush Ranch	105	122	2006
River Oaks Ranch	88	1031	1987	Garlic Creek West	167	168	2007
Driftwood Falls Estates	63	66	1987	Chama Trace	46	98	2007
Kirby Springs	98	856	1989	Elm Grove	108	63	2007
Meadow Creek Ranch	75	243	1990	Sunfield	159	101	2008
Hill Country Ranches	226	2457	1990	**Total Acres:**			**27,193**

Source: Hays County Development Services Department, 2014.

Attachment E-2

Subdivision Developments in Travis County

E-2: Past Subdivision Developments in Travis County					
Name	**Acres**	**Year**	**Name**	**Acres**	**Year**
Manchaca	11.31	1881	Steiner Ranch Ph 1 Sec 1	60.07	1988
Matthews Addition	17.89	1904	Paleface Park Ph 1 Sec C	70.46	1989
Town of Creedmoore	32.99	1907	Paleface Park Ph 1 Sec B	212.14	1989
Bruton Springs Subd	161.20	1912	Kinser-Wheeler	36.90	1989
Knollwood	8.30	1953	Estates Above Lost Creek Resub Lot 44 Blk B	1.87	1989
Panther Hollow No 1	13.59	1954	Seven Oaks Sec 3 Ph 1 Amend	27.05	1989
Baldwin's Point Resub	24.08	1954	Ben Crenshaw Golf Course	223.79	1989
Lakeland Park	22.69	1955	Estates Above Lost Creek Sec 2	2.01	1989
Manchaca Gardens	30.40	1955	Hills of Lost Creek Sec 4 PhA Am Lots 5-6 Ph A & Lot 26 Ph B	1.51	1989
Izaak Walton	7.57	1956	Ochs Acres	0.96	1989
Horseshoe Bend Estates	19.74	1956	Drummond Addn Amended	12.62	1989
Rio Vista Subd	26.51	1956	Mackie Subd	8.05	1990
Bowden	8.42	1956	Oak Run Estates Am Lots 51-53	4.15	1990
Big Bee Creek Subd No 2	8.76	1956	Ridge at Barton Creek	40.16	1990
Mrs. Rosa J. Spillman Estate	36.68	1956	Forest at Westlake	27.32	1990
S & S	18.00	1958	Kingston Subd	1.00	1990
Mooreland Addn	36.69	1958	Oak Hill Park Amended Lots 2 & 3	3.32	1991
Austin Lake Estates Sec 3	62.32	1959	Lewis Mountain Ranch Ph 2	46.04	1991
Austin Lake Estates Sec 2	66.05	1959	Summit at West Rim on Mount Larson	102.41	1991
Austin lake Estates Resub	2.28	1959	River Cove Subd	22.66	1991

E-2: Past Subdivision Developments in Travis County

Name	Acres	Year	Name	Acres	Year
Westwood Sec 1	15.68	1959	Blackburn Subd	4.97	1991
Lange Addn	14.45	1960	Klassen Addn	4.71	1991
Westoak Resub	8.52	1960	River Terrace	2.47	1991
Westlake Highlands Sec 2 Blk A-E	29.49	1960	Robinson Addn	7.38	1991
Westlake Highlands Blk 1 & 2	12.07	1960	Rose Hill Subd.	9.94	1991
Geneva Estates Sec 1	56.44	1961	Slaughter Creek Acres Resub Lot 5	3.78	1991
Rivercrest Addn Sec 1	22.84	1961	Travis Settlement Sec 8	32.84	1992
Austin Lake Hills Sec 3	68.85	1961	Graef Road Estates	195.02	1992
Austin Lake Hills Sec 1	101.68	1961	Shady Hollow West AISD No 1	45.69	1992
Austin Lake Hills Sec 2	118.44	1961	John W. Woodruff Subd	14.23	1992
Westwood Sec 2	22.01	1961	Lewis Mountain Ranch Ph 3	36.68	1992
Barton Springs Estates Resub Lot 20	2.25	1962	Dominion Hill	37.86	1992
Lake Oak Estates No 2	70.24	1962	Barton Creek Club Driving Range	12.94	1992
Cardinal Hills Estates Unit 2	55.56	1962	Stauch Subd.	0.34	1992
Cardinal Hills Estates Unit 1	65.09	1962	Ravine Ph 1	27.31	1992
Lake Oak Estates Sec 1	44.21	1962	Davenport West Tr D Sec 1 Rob Roy Ph 3	68.49	1992
Silver Spur Ranchettes Sec 2	137.27	1962	Canyon Oaks	14.61	1992
Bothmer Addn	6.83	1962	J Hoover Mackin Addn	2.49	1992
Rockwood Subd	20.04	1963	Aqua Monte Sec 2 Amend Lots 9 & 10	4.47	1992
Lago Villa	5.29	1963	Burson Subd	9.94	1992
Manana West	6.52	1963	Boyer Acres	4.05	1992
Westwood Sec 3	12.42	1963	Diamond Sky Subd	55.08	1992
Wynnrock Estates Sec 1	76.90	1963	River Place Sec 3B	8.69	1992
Charles A. Garner Subd	2.91	1963	River Place Sec 3A	1.83	1992
George Milton, Jr. Subd	6.42	1963	Barton Creek Preserve Ph 1	19.67	1992

E-2: Past Subdivision Developments in Travis County					
Name	**Acres**	**Year**	**Name**	**Acres**	**Year**
Aqua Verde Resub Lots L & M Blk G	0.19	1963	St Stephens School	245.33	1992
Westoak Sec 3	15.90	1964	Austin Lake Estates Sec 2 Amended	2.12	1992
Westlake Highlands Blk 2A	3.16	1964	Rocky Creek Estates Sec 2	70.50	1993
Lake Ridge Estates Sec 1	26.53	1964	Cravatt Subd	4.73	1993
Lake Austin Village	7.21	1964	Ridge at Thomas Springs Amend Lots 8-9	1.46	1993
Perkins Valley	14.77	1964	Willard Estates	3.71	1993
Sutherland Subd No 1	4.16	1964	Grape Creek Estates South	20.72	1993
Aqua Verde	31.13	1965	Lookout Point	21.33	1993
Westlake Highlands Blk 3 Amend Lots 3 & 4	9.51	1965	Donna Glen Addn	3.27	1993
RN Goeth Subd	0.62	1965	Flying H Farms	9.55	1993
Westlake Highlands Sec 4	0.63	1965	McTeer Acres	4.10	1993
Aqua Monte Sec 2	24.24	1965	Lewis Mountain Ranch Ph 4	63.70	1993
Aqua Monte	23.75	1965	Patterson Place Sec 1	44.49	1993
Rolling Hills West	37.64	1965	Barton Creek Sec G Ph 1	88.46	1993
Rivercrest Addn Sec 2	20.04	1965	Lost Creek Sec 1 Amend Lots 14-15	1.14	1993
Westoak Sec 2 Resub Lots 16-19	5.84	1965	Hills of Lost Creek Sec 1 Resub Lot 2	0.59	1993
Rivercrest Sec 2 Resub Lot 66 Blk A & Lot 21 Blk D	0.46	1965	Bridgeview Terrace	10.04	1993
Akres Bonitos	1.89	1965	Rob Roy on the Lake Sec 1 Amended Lots 14 & 18	2.91	1993
Westlake Highlands Sec 2 Resub Lots 11-14	1.97	1966	Knight/Bash Subd	1.43	1993
Ridgecrest Subd	2.06	1966	Ravine Ph 2	2.03	1993
Westlake Highlands Lot 1 Blk 4	0.57	1966	Paddock at Commons Ford	35.72	1993
Westlake Highlands Sec 5 Ph 2 Revised	7.82	1966	VP Acres	12.01	1993
Hidden Hills Sec 1	31.11	1966	River Place Sec 3 Am Lot 11 Blk H	0.28	1993

E-2: Past Subdivision Developments in Travis County

Name	Acres	Year	Name	Acres	Year
Big Bee Creek	36.89	1966	Loma Graciosa Subd Resub Lot 7	7.05	1993
Big Bee Creek Subd No 2 Resub	4.62	1966	Madrones Subd	83.86	1993
Windy Cove Subd	9.66	1966	Barton Creek Preserve Ph 2	20.82	1993
Highland Creek Lake Subd Sec 1	56.28	1967	Barton Creek Preserve Ph 3	57.08	1993
Southview Estates	96.36	1967	Arrowhead Acres Addn	23.84	1993
Camelot Sec 1	29.63	1967	Jackies Gymnastics Subd	4.90	1993
Westlake Highlands Blk 6	7.92	1967	Crystal Mountain at Barton Creek Sec 2 1st resub am plat	46.76	1993
Lake Ridge Estates Sec 2	15.63	1967	Falls at Barton Creek Sec E Blk B	24.42	1993
Southwest Gate Addn	18.53	1967	Harkins/Wittig Resub Westview Est Sec 3 Lot 24	18.21	1993
Perkins Valley II	9.87	1967	Barton Creek Preserve Ph III	72.01	1993
Mountain Creek Lakes Sec 1	117.50	1968	Barton Creek Preserve Ph III	72.73	1993
Pedernales Canyon Ranch Ph 1	471.36	1968	Lucky Lake Ranch Ph 1	9.91	1994
Hillside Springs	24.52	1968	Southwell Addn	4.13	1994
South View Estates Sec 2	66.79	1968	Rob Roy on the Lake Sec 3 Resub Lot 70 B	19.34	1994
Sigler Subd	2.39	1968	Lake Shore Annex #3	0.58	1994
Camelot Sec 2	22.68	1968	Senna Hills Sec 2	61.02	1994
Westlake Highlands Blk 3 Ph 2	1.80	1968	River Terrace Sec II	4.14	1994
Lake Ridge Estates Sec 3	24.77	1968	Tumbleweed Canyon	14.97	1994
Leigh Addn	1.01	1968	Kirchner Addn	1.78	1994
Freund Sleepy Hollow Lake Austin Subd	5.61	1968	River Place 7B	30.29	1994
Fulkerson Subd	3.22	1968	Overlook at River Place	25.15	1994
Perkins Valley Sec 4	7.67	1968	Penn Subd	1.14	1994
Mopac/360 No. 1	20.31	1968	River Pointe Am Lots 2 & 3	4.25	1994

E-2: Past Subdivision Developments in Travis County

Name	Acres	Year	Name	Acres	Year
Rayford Subd	3.07	1968	Reese Acres	0.06	1994
Offer Subd	2.98	1968	Preserve at Barton Creek	73.35	1994
Valley Lake Hills Sec 1	95.56	1969	Senna Hills Sec 1	11.97	1994
Spring Valley Estates	19.91	1969	Barton Cove Sec 1	5.04	1994
Blue Hills Estates	87.25	1969	Bosworth	1.42	1995
Camelot Sec 3	29.15	1969	Oconomowoc West Sec 1	64.18	1995
Westlake Highlands Blk 3 Ph 3	0.58	1969	Oak Run West Resub Lots 34-35	14.21	1995
High Oaks	10.74	1969	Shadowbye Acres	3.47	1995
Westlake Highlands Blk 3A	4.70	1969	Patterson Place on Crystal Creek	26.01	1995
Poole & Lane Subd	5.85	1969	Barton Creek Sec G Ph 1 Am Lot 30 & 31 Blk B	89.91	1995
Westlake Highlands Blk 3	2.22	1969	Island on Westlake	14.53	1995
Lake Ridge Estates Sec 4	21.43	1969	Davenport West Tr C Sec 3 St Stephens School	104.66	1995
Bruton Springs Reseb 50-51, 21 & 61	20.24	1969	River Hills Amend	19.90	1995
Apache Shores Sec 2	217.08	1969	Akumal Subd	30.03	1995
Gary Patterson Subd	1.21	1969	City View Subd	1.21	1995
Mystic Oak Estates	53.90	1969	Senna Hills Sec 1A Amend Lots 57-64	2.35	1995
Southwest Gate Addn No 2	3.06	1969	Senna Hills Sec 1A	36.66	1995
Capitol View Estates	69.03	1969	Seven Oaks Sec 2 Ph 2	45.83	1995
Capitol View Estates Resub Lot 10, 11, 21, 22 & 23	23.07	1969	Austin Lake Hills Sec 1 Resub	2.00	1995
Capitol View Estates Resub Lot 14 & 15	8.78	1969	Manana West Sec 2 amended Plat Lots 9 & 10	10.30	1995
Bar S Ranch Subd #2	4.48	1969	Lake Pointe Ph 1A	17.32	1995
Bee Creek Hill Sec 1	16.38	1970	Lake Pointe Ph 1B Replat Lot 21 Blk H	2.27	1995

E-2: Past Subdivision Developments in Travis County					
Name	**Acres**	**Year**	**Name**	**Acres**	**Year**
Twin Lake Hills	129.99	1970	Lake Pointe Ph 1A Resub Lot 15 Blk R	6.58	1995
Bee Creek Hill Sec 2 (remainder)	27.83	1970	Lake Pointe Ph 1B	51.34	1995
Southern Hills Sec 1	13.89	1970	Villas at River Place	16.02	1995
Westview Estates Blk C Amended	9.30	1970	Westminster Glen Ph 1A	8.53	1995
Geneva Estates Sec 1 Resub Lots 9-11 Blk A	3.43	1970	Panther Hollow East	9.69	1995
Westview Estates	62.58	1970	River Place Sec 10	10.77	1995
Scenic Brook Estates Sec 1	27.42	1970	River Place Sec 7C	0.39	1995
Hillside Springs Sec 2	40.70	1970	Steiner Ranch Ph 1 Sec 3	33.52	1995
Paisano Addn	2.00	1970	Illakee Subd	4.96	1995
Scenic View West Sec 2	4.12	1970	Two Creeks Addn	11.78	1995
Westlake Madrones Sec 1	1.61	1970	M.C. Graham Subd	1.79	1995
Cardinal Hills Estates Unit 7	110.78	1970	Southwest Hills Sec 2 & 3	17.81	1995
Cardinal Hills Estates Unit 6	47.82	1970	Southwest Hills Sec 2 & 3	14.77	1995
Cardinal Hills Estates Unit 11	101.07	1970	Edwards Crossing Ph A Sec 1	1.06	1995
Cardinal Hills Estates Unit 12	151.66	1970	Barton Creek Sec K	5.35	1995
Apache Shores Sec 4	18.71	1970	Hawthorn Ridge Subd	10.61	1995
W.E. Powell Subd	6.50	1970	Peak Lookout Place	1.71	1995
Slaughter Creek Acres Resub Lot 4 Blk C	3.01	1970	Ranchero Del L.A.	8.89	1995
Slaughter Creek Acres Resub Lot 6 Blk C	1.55	1970	Best Technologies Center	69.37	1996
Slaughter Creek Acres Resub Lot 7 Blk E	3.55	1970	Scenic Ridge	38.36	1996
Slaughter Creek Acres Resub Lot 5 Blk F	3.39	1970	Angelwylde Sec 1	20.34	1996
Slaughter Creek Acres Resub Lot 4 Blk A	4.92	1970	Barton Creek Sec G Ph 2	74.98	1996
Perkins Park Sec 1	13.83	1970	Travis County MUD #4 Water Treatment Plant	2.29	1996
Slaughter Creek Acres Resub Lot 1,2 Blk E	2.00	1970	Lake Shore Addn Amended Lots 97 & 98	1.68	1996

E-2: Past Subdivision Developments in Travis County					
Name	**Acres**	**Year**	**Name**	**Acres**	**Year**
Slaughter Creek Acres	15.44	1970	Jack Ball Estates	24.88	1996
Valley View West	10.91	1970	Lake Pointe Ph 2	61.37	1996
Inverness Point	23.91	1970	Lake Pointe Ph 1B Replat Lots 1-5 Blk Q	1.89	1996
Slaughter Creek Acres Resub Lot 6-7 Blk G	5.14	1970	Westcliff Sec 1A Am Lots 26 & 27	5.02	1996
Slaughter Creek Acres	3.42	1970	Long Canyon 3A	55.20	1996
Hazy Hills Ranchettes Sec 1	186.93	1971	River Place Sec 8	22.65	1996
Bear Creek Park	93.68	1971	Steiner Ranch Ph 1 Sec 4A	25.63	1996
Onion Creek Meadows	171.43	1971	Steiner Ranch Ph 1 Sec 4B	23.21	1996
Village Oak West	33.21	1971	Lake Country Estates Sec 2	18.37	1996
Granada Hills Amended Lots 3-8 Blk 3	165.33	1971	Lake Country Estates Amend Lots 7-10 Blk B	7.15	1996
Scenic Brook Estates Sec 1 Resub Lots 1-5 & 7-9	17.70	1971	Flint Rock Estates	8.73	1996
Scenic Brook Estates Sec 1 Resub Lot 30	2.14	1971	Barton Creek Preserve Ph 3 Am Lots 5 & 3A, 6A	23.39	1996
Scenic Brook Estates Sec 2 Re-Amended	79.06	1971	Glowka Acres Subd	6.64	1996
Scenic Brook Estates Sec 2 Re-Amended Resub Lot 7-11, 6 & 12	10.02	1971	Home Tech Subd	12.43	1996
Wilkerson Estates	65.08	1971	Austin Motor Mile Inc Subd	7.56	1996
McCormick Addn	1.02	1971	Salgado's Acres	3.92	1996
Knollwood Resub Lot 24-26	2.69	1971	Old Manchaca Subd	6.85	1996
Camelot Sec 3 Resub Lot 38-42	3.36	1971	Thornton Subd	0.33	1996
Camelot Sec 4	7.01	1971	Destiny Hills Sec 1	66.80	1997
Canyon View West	3.12	1971	Southwest Territory Sec 3 Amended Lots 1,2,3	7.14	1997
Scenic View West Sec 3	0.40	1971	1626 Park Addn	20.14	1997

E-2: Past Subdivision Developments in Travis County

Name	Acres	Year	Name	Acres	Year
Canyon View Estates	8.04	1971	Scenic Brook Estates Sec 1 Resub Lots 10-11	6.17	1997
Westlake Highlands Blk 6A	0.95	1971	Estates of Lewis Mountain	44.87	1997
Westlake Highlands Blk 6A Resub Lots 3-4	0.79	1971	Barton Creek Sec E Ph 1	27.99	1997
Skyview Forest	4.36	1971	Palomino Ridge	70.02	1997
Smoky Ridge	4.33	1971	Gateway South Lot 2 at Barton Creek	6.38	1997
Price & Halton Addn	3.03	1971	Point at Barton Creek	73.48	1997
Apache Shores Sec 5	167.43	1971	Terraces at Barton Creek	19.45	1997
Slaughter Creek Acres Resub Lot 1 Blk G	3.24	1971	Barton Creek North Rim	60.67	1997
Slaughter Creek Acres Resub Lot 1-2 Blk F	7.81	1971	Barton Creek Club Third Replat	43.14	1997
Slaughter Creek Acres Resub Lot 6 Blk E	2.52	1971	Governor's Hill at Barton Creek	31.39	1997
Chappell Addn	6.60	1971	Barton Creek ABC Midsection	66.27	1997
Slaughter Creek Acres Resub Lot 2 Blk C	2.47	1971	Westview on Lake Austin Ph C Sec 5	16.99	1997
Slaughter Creek Acres Resub Lot 3 Blk C	3.00	1971	Summit Park Subd	10.08	1997
Slaughter Creek Acres Resub Lot 4 Blk E	3.50	1971	Lake Side Addn Resub Lot 27-28	3.00	1997
Slaughter Creek Acres Resub Lot 4 Blk F	4.99	1971	Carriage Crossing Sec 2	21.63	1997
Capitol View Estates Resub Lot 5	4.54	1971	Senna Hills Sec 4	26.54	1997
Penion Addn	5.44	1971	Senna Hills Sec 1B	9.85	1997
Slaughter Creek Acres Resub Lot 2 Blk G	4.58	1971	Aqua Monte Sec 2 Am Lot 5 Blk EE	4.13	1997
Slaughter Creek Acres Resub Lot 1-3 Blk A	19.63	1971	Austin Lake Estates Sec 1	90.08	1997
Norde Addn	5.02	1971	Saratoga Point	11.11	1997
Slaughter Creek Acres Resub Lot 5 Blk E	3.48	1971	River Terrace III	5.84	1997
Slaughter Creek Acres Resub Lot 2 Blk D	3.67	1971	Lake Pointe Sec 3 Ph 1	11.22	1997
Slaughter Creek Acres Resub Lot 8	2.80	1971	Lake Pointe Sec 3 Ph 4	13.86	1997
Rayford Subd #2	2.58	1971	Lake Pointe Sec 5	34.58	1997

E-2: Past Subdivision Developments in Travis County					
Name	**Acres**	**Year**	**Name**	**Acres**	**Year**
Hamilton Hills	131.39	1972	Lake Pointe Ph 4A	28.00	1997
Long Branch Valley	117.90	1972	Lake Pointe Ph 4B	6.30	1997
Shady Hollow Addn	56.77	1972	River Place Sec 11	53.15	1997
Twin Creek Park	42.78	1972	Glenlake 2A	18.97	1997
Arroyo Doble Sec 2	24.33	1972	Stoneridge Place Subd	5.19	1997
Arroyo Doble	15.20	1972	Sandbird Subd Sec 2 Am Lot 1-3	3.00	1997
Onion Creek Meadows Resub Lot 13-14	2.63	1972	Steiner Ranch Ph 2 Sec 3A	62.15	1997
Granada Hills Amend Resub Lots 132-133	2.00	1972	Steiner Ranch Ph 2 Sec 3B	16.88	1997
Westview Estates Sec 2	81.41	1972	Steiner Ranch Ph 1 Sec 4C	15.96	1997
Isabel Addn	1.91	1972	Illakee II Subd	9.27	1997
Scenic Brook Estates Sec 1 Ph 2	50.67	1972	Pawnee Peak Subd	10.03	1997
Scenic Brook Estates Sec 1 Resub Lot 13	2.07	1972	Wild Cherry Subd	9.74	1997
Scenic Brook Estates Sec 1 Resub Lots 24-29	5.55	1972	Crystal Mountain Executive Park	4.87	1997
Lost Creek Sec 1	75.66	1972	Brazos-Colorado Subd	9.66	1997
Camelot Sec 2 Ph 2	4.19	1972	Slaughter Creek Acres Resub Lot 5-6 Blk C	1.99	1997
Camelot Sec 1 Resub pt Lot 8	3.77	1972	Rob Roy on the Creek Sec 7 Replat	2.66	1997
Knollwood Resub Lot 10-11	3.60	1972	Westview on Lake Austin Ph C Sec 5	14.53	1997
Knollwood Resub Lot 18-22	6.92	1972	Barton Creek Sec J Ph 1	27.31	1997
Knollwood C Resub Part Lot 1	4.25	1972	Robie Acres, Second Amended plat	5.01	1997
Knollwood A	0.89	1972	C Bar Ranch Lakeview Acres Resub Pt Lot 1	0.77	1997
Knollwood B	1.01	1972	Shady Hollow West	59.52	1998
Westlake Highlands Sec 6	12.74	1972	Hill Country Ph 2A Am Lots 14 & 15	2.55	1998
Scenic View West Sec 4	9.78	1972	Michael Dale Subd	6.81	1998

E-2: Past Subdivision Developments in Travis County					
Name	**Acres**	**Year**	**Name**	**Acres**	**Year**
Spence Addn	7.72	1972	Overlook at Lewis Mountain Sec 1	47.82	1998
Wild Basin #2	0.41	1972	Nassour Acres	15.73	1998
Lake Ridge Estates Sec 2A	1.98	1972	St Gabriel Catholic School	31.37	1998
Aqua Monte Sec 2 Resub Pt Blk E & D	10.98	1972	Barton Creek ABC West Ph 1	147.13	1998
Hillside Vista	7.90	1972	Cabin Ridge Estates	61.42	1998
Rolling Hills West Sec 2	3.74	1972	Westview on Lake Austin Ph C Sec 2 Replat	43.84	1998
Apache Shores Sec 6	112.55	1972	High Oaks Amend Lots A & C	4.18	1998
Wilkerson Estates Resub Lot 12	7.47	1972	Westview on Lake Austin Ph B Amend Lots 27 & 28	1.22	1998
Wiley Pope Subd	6.50	1972	Buell-Rude Subd	1.90	1998
Capitol View Estates Resub Lot 4	4.51	1972	Rockcliff Bend Subd	2.99	1998
Webers Hill	5.76	1972	Sterling Acres	24.38	1998
Sutherland Addn	14.10	1972	Werkenthin Sec 4	12.28	1998
Lot 1-A Lane Addn	2.49	1972	Werkenthin Sec 2	9.34	1998
Rolling Hills West Resub Lots 4-5 Blk E	0.73	1972	Werkenthin Sec 1	17.23	1998
Hill Top Manor	17.02	1972	HA Reed Subd Resub Tr 1	6.25	1998
Hill Top Manor	2.12	1972	Werkenthin Sec 3 Amend Lots 1-13 Blk D&F	35.45	1998
Hill Top Manor	0.28	1972	Werkenthin Sec 5 Amend Lots 40-43 Blk D	22.46	1998
Hazy Hills Ranchettes Sec 2	72.97	1973	Werkenthin Sec 6	8.04	1998
Lick Creek Ranch Ph 2 Sec 1	117.26	1973	Oak Shores on Lake Austin Sec 4	13.28	1998
Shady Hollow Addn Sec 2 Ph 1	94.30	1973	Resaca Boulevard Street Dedication	2.95	1998
Twin Creek Park Sec 2	20.74	1973	Lake Pointe Sec 3 Ph 2	8.28	1998
Arroyo Doble Sec 3	16.49	1973	Lake Pointe Ph 4C	2.32	1998
Westview Estates Sec 3	147.23	1973	Lake Pointe Sec 3 Ph 5	7.02	1998

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Name	Acres	Year	Name	Acres	Year
Hudson Tract Resub	1.05	1973	Lake Pointe Ph 1E	0.29	1998
Sigler Subd #2	2.97	1973	BHN Subd	1.97	1998
Camelot Sec 1 Resub Lot 1	2.37	1973	River Place Sec 21	21.48	1998
Camelot Sec 2 Resub Lot 22	2.04	1973	River Place Sec 22	45.94	1998
Camelot Sec 1 Resub Lot 9A	3.60	1973	River Place Sec 13	59.64	1998
William J Darilek Subd	2.75	1973	River Place Sec 12	31.55	1998
Camelot Sec 1 Resub Lot 15	1.07	1973	Westminster Glen Ph 1D	51.48	1998
Camelot Sec 2 Resub Lot 21	1.00	1973	Westminster Glen Ph 1E	42.54	1998
Westlake Highlands Sec 7	15.32	1973	Westminster Glen Ph 1C	25.03	1998
RA House One	1.12	1973	Westminster Glen Ph 1B	9.28	1998
Westridge Estates	41.74	1973	Steiner Ranch Ph 1 Sec 5B	24.26	1998
Austin Lake Estates Sec 2 Resub Lots 9 & 10 Blk 7	0.63	1973	Steiner Ranch Ph 1 Sec 5C	44.38	1998
Stone Subd Resub Lot 1	2.28	1973	Riverfront Estates	26.50	1998
River Ridge	49.70	1973	Steiner Ranch Ph 1 Sec 4E	37.12	1998
Travis Oaks Trails	41.00	1973	Steiner Ranch Ph 2 Sec 3C	23.97	1998
Cardinal Hills Estates Unit 11 Rev Lot 23	4.06	1973	Steiner Ranch Ph 2 Sec 3D	17.82	1998
Apache Shores Sec 7	109.68	1973	Steiner Ranch Ph 1 Sec 5A	22.72	1998
Apache Shores Sec 7 Am Lot 57, 58	1.96	1973	River Bend	210.93	1998
C&D Addn	2.52	1973	Apache Shores Sec 6 Am Lots 7-10	2.13	1998
Appaloosa Run	115.61	1973	Palomino Ridge Amend Lots 9 & 10	10.50	1998
High Road View	1.26	1973	151 Acre Tract Subd	137.34	1998
Long Branch Valley Sec 2	85.67	1974	Lake Shore Addn Resub Lot 80	11.11	1998
Golden Lake Estates	12.68	1974	Madrone Ranch	189.94	1999
Kellywood Estates	13.18	1974	Barton Creek Sec J Ph 2	240.49	1999

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Name	Acres	Year	Name	Acres	Year
Arroyo Doble Estates Sec 1	56.30	1974	Scenic Brook Estates Re-Amended Lots 2 & 3	3.34	1999
Arroyo Doble Sec 2 Resub 8 & 17 Blk A	4.05	1974	Scenic Brook Estates Sec 2 Re-Am Resub Lot 39	3.33	1999
Village Oak West Resub Lots 12 & 13	0.61	1974	West Austin Athletic Club	9.60	1999
Glen-Ledge Park	18.79	1974	Barton Creek Sec G Ph 2 Resub Lots 51-54 Blk B	2.22	1999
Southwest Hills Addn	18.67	1974	Summit at West Rim on Mount Larson Blk D Sec 1	36.31	1999
Mary Beth Gartner Addn	2.00	1974	Bishops Bend	8.71	1999
Hines & Bookout Subd	1.66	1974	Sendero Luminoso	5.53	1999
Barton Valley Resub Lot 7	7.29	1974	Simmit at West Rim on Mount Larson Blk D Sec 4	1.51	1999
Buie Subd	1.69	1974	Commons Ford Canyon	19.43	1999
Camelot Sec 5	10.84	1974	Jacarandas at the Creek	6.50	1999
Barton Valley	40.88	1974	Fleecie Purnell Estate Subd	46.45	1999
Fortunes Valley	28.85	1974	Lake Pointe Sec 9 Amended Plat	39.00	1999
Barton Valley Resub Lot 6	5.49	1974	Lake Pointe Sec 3 Ph 3	10.79	1999
Camelot Sec 3 Resub Lot 57	3.85	1974	Strawn Subd	7.07	1999
Casa Diablo	2.44	1974	Lake Pointe Sec 7	40.16	1999
Woodlake Trails	22.48	1974	Lake Pointe Sec 4	12.76	1999
New Land	1.00	1974	Lake Pointe Ph 1C	0.28	1999
Anken Addn	1.00	1974	Lake Pointe Ph 1A Replat Lot 6 Blk O	0.31	1999
Manchaca Gardens Resub Lots 2-9 Blk B	5.66	1974	Lake Pointe Ph 1B Replat Lot 5 Blk O	0.32	1999
Slaughter Creek Acres Resub Lot 1 & Lot A Resub Lot 2	5.00	1974	River Place Golf Course	0.28	1999
Slaughter Creek Corner	3.78	1974	River Place Golf Course	202.79	1999

E-2: Past Subdivision Developments in Travis County

Name	Acres	Year	Name	Acres	Year
Fred Lucksinger Subd	11.78	1974	River Place Sec 15	78.75	1999
Ballard & Sons Inc Addn	0.83	1974	Westminster Glen Ph 1D Replat Lot 56-58	5.63	1999
Rolling Hills West Sec 4 1st Resub Lots 4-5	0.77	1974	Westminster Glen Ph 1C Replat Lots 18-20	4.01	1999
Granada Hills Resub Lot 177	0.71	1974	Westminster Glen Ph 1E Replat Lot 95-97	5.09	1999
Arroyo Doble Sec 3 Resub 5 & 6 Blk B	1.22	1975	Westminster Glen Ph 1E Replat Lot 82-84 & 88-90	6.04	1999
Knollwood Sec 2 Resub Part Lot 1,2,7	20.88	1975	Coldwater Sec 4 Ph C	1.49	1999
Brewer & Grandinetti Resub	0.99	1975	River Place Sec 10 Am Lots 11-13 Blk A	1.26	1999
Westlake Highlands Sec 8 Amended	27.15	1975	Stoneridge Price Subd	5.05	1999
Camelot West	4.43	1975	John H. Carrell Subd	3.00	1999
Dittmar-Hanson Subd	8.86	1975	JLG Subd	2.98	1999
Granada Estates Sec 1	102.04	1975	Flint Valley	5.22	1999
Westlake Highlands South Section	2.64	1975	Rob Roy West	1.97	1999
Crosswind	116.62	1975	Barrow's Lakeside Addn, Am Lot 2	3.12	1999
Louie T Bailey Subd	2.67	1975	Simmons-Williams	10.00	2000
Lake Shore Addn Resub Lot 22	0.21	1975	Paleface Park Ph 1 Sec C Resub Lots 9 &10	17.63	2000
Luciano Castro Subd	19.27	1976	Werkenthin Sec 1 Blk C Lots 1 & 2 Amd	3.16	2000
Arroyo Doble Sec 4	50.08	1976	Werkenthin Sec 5 Blk F Lot 24 Amd	1.05	2000
Blue Hills Estates Resub	6.03	1976	Sonesh Estates	59.56	2000
Rawhide Ridge	7.28	1976	United Methodist Church Subd	9.24	2000
Appaloosa Run Resub Lots 35 & 36	39.95	1976	Barton Creek Sec M	181.49	2000
Lost Creek Sec 2	124.38	1976	Waldorf School	19.45	2000
Lost Creek Sec 2 Resub Lot 1 & 27	7.29	1976	Southwest Hills Sec 4	27.09	2000
Lake Side Addn Resub Pt Lot 47	6.71	1976	Hazelhurst Subd	77.34	2000

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Name	Acres	Year	Name	Acres	Year
Slow Turtle Subd	20.18	1976	Overlook at Lewis Mountain Sec 2	48.05	2000
Wild Basin Wilderness	7.16	1976	Castle Ridge Acres	4.03	2000
Wild Basin #2	0.41	1976	Lake Side Addn Am Lots 40-42, 45, 46, 49, 50, 53 & 54	59.16	2000
Oestrick Addn	4.58	1976	Rivercrest Addn Sec 3	8.73	2000
Gentry Estates	5.74	1976	Seven Oaks Sec 4	55.36	2000
Austin World of Archery	43.20	1976	St Tropez Amended Lots 85A, 87A-B, 87E	2.29	2000
Boggy Creek Addn	52.20	1976	Summit at West Rim on Mount Larson Blk C	4.65	2000
Jerry Green Subd	0.87	1976	Senna Hills Sec 5B	38.46	2000
Wunneburger Estates I	2.66	1977	Tumbleweed Trail Estates Amend Lots 4 & 5	2.26	2000
Kellywood Estates Sec 2	20.09	1977	Werkenthin Sec 6 Amend Lots 35-38	2.65	2000
Arroyo Doble Sec 2 Resub Lot 2-3 Blk D	0.54	1977	Werkenthin Sec 2 Amend Lots 11-22	8.01	2000
Oak Hill Fire Dept Subd Lots 1&2 Ridge at Thomas Springs	0.32	1977	Porsch Subd	8.01	2000
Forest Park	22.77	1977	Seven Oaks Sec 5	232.77	2000
Granada Estates Sec 1 Resub Lots 16 & 17	1.97	1977	Lake Ridge Heights	8.86	2000
Camelot Sec 1 Resub Lot 12	2.90	1977	Werkenthin Sec 2 Amend Lots 11-14 Blk C	4.47	2000
Barton Valley Resub Lot 11-13 & 15-17	36.89	1977	Bruton Springs Subd Resub Lot 46	7.98	2000
Camelot Sec 1 Resub Lot 13	2.40	1977	Lake Pointe Sec 8	4.52	2000
Hills of Lost Creek Sec 1	5.72	1977	Lake Pointe Sec 10	40.87	2000
Camelot Sec 2 Resub Lot 30	2.25	1977	Coldwater Sec 1 Am Lots 1&2	29.95	2000
Camelot West Sec 2	0.56	1977	Angelwylde Sec 2	11.11	2000
Baker Hills	12.52	1977	Angelwylde Sec 2	41.45	2000
Westlake Highlands Sec 2A	4.92	1977	Hood-Davis	5.26	2000

E-2: Past Subdivision Developments in Travis County					
Name	**Acres**	**Year**	**Name**	**Acres**	**Year**
Kellam Westlake Highlands	0.50	1977	Gaines Ranch Subd & Gaines Ranch Subd II	15.62	2000
Larry Jameson Subd	7.67	1977	Troy Dale Patterson Subd	1.55	2000
HA Reed Subd	2.00	1977	Illakee III Am Lots 1 & 2	7.31	2000
Lake Ridge Estates Sec 2B	1.00	1977	Angelwylde Sec 3	15.21	2000
Austin Lake Estates Sec 1 Resub Lot 1 & 24	0.52	1977	Angelwylde Sec 3	21.52	2000
Manana West Sec 2	11.17	1977	Peyton Brooke at Rob Roy Replat	3.40	2001
Smoky Ridge Annex	2.23	1977	Bee Creek Commercial Center Sec 1	10.45	2001
Atkinson-North Lot 4 Blk A Oak Shores on Lake Austin Sec 4	1.66	1977	Tiburon Hills	26.48	2001
Barton Springs Estate Amended	3.10	1977	Roughin Hills	9.83	2001
Mountaintop Acres	51.23	1977	Lometa de la Luna	8.30	2001
Cherry Mountain Ph 2	21.06	1977	Charles Bell Subd	33.63	2001
Malone Addn Sec 3	2.00	1977	Scenic Brook Estates Sec 1 Amend Lots 19-21	2.62	2001
Mount Addn	0.78	1977	Cedar Ridge Estates	27.91	2001
Wild Basin Oaks	5.62	1977	Terraces at Barton Creek Amend Lots 6-8 Blk A	4.35	2001
Vista Oaks Sec 1	34.63	1978	Barton Creek Sec G Ph 2 Amend Lots 46-47 Blk B	1.59	2001
Long Branch Valley Sec 3	105.19	1978	Tierra Madrones Amend Lot 4 & Lot 2 Blk A Gardns of Westlake	3.92	2001
Southwest Territory Sec 1	38.58	1978	Rob Roy 360	16.82	2001
Southwest Territory Sec 3	7.88	1978	6836 Bee Caves Business Park	6.96	2001
Pittman Addn	3.91	1978	Kugler Subd	1.76	2001
Thaxton Road Subd	37.90	1978	High Canyon Estates	15.22	2001

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Name	Acres	Year	Name	Acres	Year
Larry L Vickers	10.05	1978	Seven Oaks Sec 2 Ph 2 Amend Lots 10 & 11	6.21	2001
Arroyo Dobe Est Sec 1 Resub Lts 1-8 B, Lot 1 C, Lts 1-5 D	43.38	1978	Lake Pointe Sec 6	17.16	2001
Verver Addn.	1.42	1978	River Place Sec 16	53.79	2001
Arroyo Doble Sec 2 Resub 3A & 4 Blk D	1.07	1978	Steiner Ranch Ph 1 Sec 8	215.33	2001
Granada Estates Sec 4	24.70	1978	Steiner Ranch Ph 2 Sec 5	218.89	2001
Granada Estates Sec 2	54.76	1978	Enclave at Kollmeyer Springs Subd	19.99	2001
Hill Country Ph 1	3.16	1978	11505 Texas 71 Ph 1	166.81	2001
Ridge at Thomas Springs	31.84	1978	Bluffs of Flintrock	10.35	2002
Glen at Thomas Springs	24.80	1978	Spillman Ranch Ph 1 Sec 5	17.53	2002
Granada Estates Sec 3	35.37	1978	Travis Settlement Business Park	29.83	2002
Granada Estates Sec 5	21.60	1978	Laws Addition No.2	1.60	2002
Smokey Mountain Oaks	52.17	1978	Travis Settlement Sec 3 Resub of Lots 177,178,179,181,182,18	13.18	2002
Lost Creek Hilltop	22.12	1978	Travis Settlement Sec 3 Resub Lots 176 & 177	4.66	2002
Lost Creek Blvd	12.27	1978	Frnka	3.06	2002
Hills of Lost Creek Sec 3	18.18	1978	Valley Lake Hills Sec 1 Rev Lots 14 & 15 Block DD	0.35	2002
Lost Creek Sec 1 Resub Pt Lot 42 Blk 14	15.99	1978	Davenport West - Block B Lot 33 &34	19.75	2002
Valley at Lost Creek Ph 2 plus common area	1.38	1978	Flintrock at Hurst Creek Sec 8 Amended	0.68	2002
Bull Mountain Ph 1	13.57	1978	Twin Lake Hills Replat Lots 60 & 61	0.47	2002
Brooks Place	0.85	1978	Las Lomitas	88.34	2002
Rosalie K Rogers Subd	0.72	1978	Twin Lake Hills Replat of Lots 112 & 113 Blk PP	0.41	2002
FC Maseles Subd	2.62	1978	Twin Lake Hills, Replat Lots 33 & 34	0.59	2002

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Name	**Acres**	**Year**	**Name**	**Acres**	**Year**
Laguna Loma	6.63	1978	Harp Subd	9.26	2002
Rio Robles Sec 1	34.80	1978	Cloyd Land	4.88	2002
Lake Ridge Estates Sec 2 Resub Lot 6-8	1.74	1978	Barton Creek Sec H	20.00	2002
Deer Creek	53.38	1978	Foothills of Barton Creek	87.20	2002
Glenlake Ph 1	213.75	1978	Davenport West Tr C3 Sec 2 Point at Rob Roy Am 9&10	5.67	2002
Milstead Addn	1.34	1978	Birdlip Subd	42.92	2002
Round Mountain Sec 2	1.07	1978	Seven Oaks Sec 2 Ph 2 Amend Lots 2 & 3 Blk B	5.93	2002
Majestic Hills Ranchettes 2	17.57	1978	River Place Sec 26	70.75	2002
Southland Oaks Sec 1	55.60	1978	Westminster Glen Ph 3	88.34	2002
Slaughter Creek Acres Resub Lot 3 Blk B	2.99	1978	Gomillion's Subd	8.27	2002
Slaughter Creek Acres Dorsey Resu Lot 3 Blk G	4.72	1978	Steiner Ranch Ph 1 Sec 9	155.32	2002
Nations Rainbow Canyon	0.54	1978	River Ridge Amend Lots 2-4	0.90	2002
Stone Subd Resub Lot 2	5.11	1978	River Dance Ph 1	101.74	2002
Majestic Hills Ranchettes	83.16	1978	Foley Subd	7.34	2002
Stone Subd	1.67	1978	Capital View Estates Resub Lot 16	4.29	2002
Bruton Springs 1st Resub Lots 5, 6	1.29	1978	Foothills of Barton Creek Am 36A Blk E	5.04	2002
La Tierra De Los Pedernales Sec 1	15.20	1979	Medway Ranch Sec 1	36.25	2002
La Tierra De Los Pedernales Sec 2	13.90	1979	Nalle Woods	0.01	2003
Clover Hill	111.95	1979	Highland Creek Lakes Sec 1 Replat of Lots 54 and 53 Blk H	0.38	2003
Arroyo Doble Estates Sec 2A	12.77	1979	Broken Oar Ranch	9.70	2003
Shady Hollow Sec 2A Ph 1	33.57	1979	Mountain Creek Lakes Sec 1 Rev Lots 38 & 39 Blk O	0.67	2003
Shady Hollow Sec 5 Ph 1	33.07	1979	Twin Lake Hills Replat of Lots 1&2, Blk YY	1.21	2003

E-2: Past Subdivision Developments in Travis County

Name	Acres	Year	Name	Acres	Year
Shady Hollow Sec 5 Ph 2	27.89	1979	Mountain Creek Lakes Sec1 Resub of Lots 5&6, Blk M	0.46	2003
Hinton Estates	2.46	1979	Twin Lake Hills Rev Lots 3, 4, 5 & 6 Blk XX	1.12	2003
Spring Valley	36.96	1979	Cypress Ranch Commercial	8.45	2003
Larson Estates	66.93	1979	Tres Vistas	38.02	2003
Hal Haralson Subd	15.00	1979	Spanish Oaks Sec 5	5.06	2003
Tanglewood West	34.68	1979	La Vista	10.04	2003
McKownville II	85.21	1979	Porter Subd No 2	20.75	2003
Sunrise Country	82.92	1979	Amarra Drive (Wynton Place)	5.49	2003
Valley at Lost Creek Ph 3 plus common area	2.98	1979	Angelwylde Place	4.64	2003
Hills of Lost Creek Sec 9	11.89	1979	J&S Subd Resub Lot 1 Blk B J Hoover Makin Addn	2.46	2003
Hills of Lost Creek Sec 7A	19.54	1979	High Road	2.85	2003
Valley at Lost Creek Ph 1 plus common area	4.57	1979	6D Ranch	613.32	2003
Hills of Lost Creek Sec 2A	0.57	1979	Werkenthin Sec 5 Amend Lot 45	5.56	2003
Best Part of Lost Creek	0.85	1979	Seven Oaks Sec 2 Ph 2 Amend Lots 15-17	6.47	2003
Bull Mountain Ph 2	18.07	1979	Seven Oaks Sec 2 Ph 2 Resub Lot 1 Blk A	6.58	2003
Robin Estates	2.32	1979	Westminster Glen Ph 3 Am Lots 47-50	10.89	2003
Bee Cliffs	2.08	1979	River Place Sec 22 Am Lots 142-145	1.02	2003
Bull Mountain Ph 1A	2.16	1979	Steiner Ranch Ph 1 Sec 6B	80.89	2003
Rob Roy Ph 2	349.79	1979	Steiner Ranch Ph 1 Sec 10A	780.62	2003
Rob Roy	204.60	1979	Steiner Ranch Ph 1 Sec 6D	56.73	2003
Lillian & Richard Creasy Subd	1.61	1979	Steiner Ranch Ph 1 Sec 6C	39.94	2003
Capitol Ridge Addn	17.21	1979	Steiner Ranch Ph 1 Sec 6F	77.22	2003
Briarpatch	16.07	1979	Steiner Ranch Ph 1 Sec 6A Replat	28.19	2003

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Name	Acres	Year	Name	Acres	Year
Richard J Kaiser Subd	1.55	1979	Steiner Ranch Parkside	73.32	2003
Westlake Crossroads	18.86	1979	Steiner Ranch Ph 1 Sec 10B	85.39	2003
Barton Valley Sec 2	5.53	1979	Steiner Ranch Ph 1 Sec 6E	72.06	2003
Lost Valley Estates	11.96	1979	Overlook at Kollmeyer Springs Subd	13.16	2003
Mercado Heights	3.16	1979	Apache shores Sec 7 Am Lot 44-45	1.41	2003
Bluff Springs Estates	11.64	1979	Apache Shores Sec 7 Am Lot 15-17	1.64	2003
Valdez Acres	1.02	1979	Fox Creek Estates	11.25	2003
Johnie F Plumley Addn	0.50	1979	11505 Texas 71 Ph 2	25.19	2003
Barton Creek Square	0.42	1979	Barton Creek Sec H Ph 3	13.98	2003
Barrow's Lakeside Addn	4.73	1979	Nalle Woods Subd	45.85	2003
Peter's & Joyce's Addn	4.27	1979	Cyrus Subd	12.73	2004
Southwest Territory Sec 2	3.19	1980	Robichaux Addn	2.04	2004
Conroy Park No 1	13.77	1980	Travis Oak Trails Am Lots 4 & 5 Blk B	0.68	2004
Shady Hollow Sec 3A Ph 3	19.69	1980	Flint Rock Hill Resub Lot 2	2.62	2004
Shady Hollow Sec 3A Ph 2	20.65	1980	Lakehurst Rev Lt 15 & 16 Tr 6	0.42	2004
Shady Hollow Sec 3A Ph 1	25.51	1980	Travis Vista Business Park	9.08	2004
Shady Hollow Sec 2A Ph 2	64.46	1980	Highland Creek Lakes Rev Lots 69, 70, 71 Blk H	0.97	2004
Chaparral Village Amended	0.16	1980	Sky Forest	12.11	2004
Granada Estates Sec 6	70.46	1980	Round Mountain Amend Lot 21 & 22	1.49	2004
Hills of Lost Creek Sec 5	28.22	1980	Overlook at Flintrock Falls	5.85	2004
Bluffs of Lost Creek	47.95	1980	West Cypress Hills Ph 1 Sec 1	67.56	2004
Lost Creek Sec 4	1.33	1980	Spanish Oaks Sec 3	19.98	2004
Emerald Bay	4.72	1980	Spanish Oaks Sec A	27.81	2004
Napier Addn	1.75	1980	Cypress Banks	11.91	2004

E-2: Past Subdivision Developments in Travis County

Name	Acres	Year	Name	Acres	Year
Lake Ridge Estates Sec 2C	1.65	1980	Exa Preslar Subd	11.47	2004
Penny L Baker Subd	2.14	1980	Barton Creek Sec N	59.78	2004
RLD Addn	5.56	1980	Alexan Mountain View	29.83	2004
Lakeside Terrace Lot 9-18 Lake Austin Village	10.44	1980	Old Bee Cave Subd	37.05	2004
Hardin Subd	12.21	1980	Collings Subd	13.08	2004
Malone Addn Sec 4	0.55	1980	Barton Creek ABC West Ph 2	120.25	2004
Francis Benoit Subd	1.35	1980	Wimberly Place	8.09	2004
Malone Addn Sec 5	0.50	1980	Wimberly Place	3.99	2004
Velasquez Subd	1.24	1980	Davenport West Tr C3 Sec 2 Point at Rob Roy Am 6&7	6.55	2004
Live Oak Community Cemetery	7.24	1980	Eanes Canyon Estates	12.84	2004
Chaparral Village	3.98	1980	Sterling Acres Amend Lots 10 & 11	2.00	2004
Barton Creek Bluff Sec 1	9.88	1980	River Place Sec 25	47.34	2004
Walter Thomas Jones Subd	2.66	1981	Panther Hollow Creek Ph 1	20.49	2004
Ashley Oaks	74.26	1981	Gomillion's Subd Resub Lot 1 & 2	4.33	2004
Fox Run Ridge	66.85	1981	Schmidt Addn	12.27	2004
MCI West	6.99	1981	Steiner Ranch Ph 1 Sec 6G	78.20	2004
Crystal Creek	17.79	1981	Steiner Ranch Pardside Amend Lot 88 & 93	2.58	2004
Barton Bend	74.98	1981	Spanish Oaks Ph 2B	36.48	2004
Barton Creek Highlands	29.06	1981	Tierra Del Caballo Sec 1	8.10	2004
Lost Creek Sec 3A	79.22	1981	Kato's Place	9.04	2004
Estates Above Lost Creek	318.37	1981	Slaughter Creek Acres Replat Lot 6B Blk E	2.50	2004
West Rim	81.12	1981	Fitzhugh Ranch Sec 1 Am Lt 11, 12 Blk A & Lt 39 Blk A	5.94	2004
Bull Mountain Ph 4 Sec 1	37.59	1981	Perkins Subd	2.80	2004

E-2: Past Subdivision Developments in Travis County					
Name	**Acres**	**Year**	**Name**	**Acres**	**Year**
Woodlake Trails Amended	14.66	1981	Greenshores on Lake Austin Ph 1	0.73	2004
Tumbleweed Trail Estates	3.41	1981	River Place at Panther Hollow Creek Ph 1	6.04	2004
Long Canyon 1A	127.97	1981	Exa Preslar Subd	2.01	2004
Glenlake Ph 2	142.05	1981	Greenshores on Lake Austin Ph 1	86.87	2004
Barton Creek Bluffs Sec 5	48.41	1981	Cypress Ranch Blvd Roadway Dedication	5.69	2004
Barton Creek Bluffs Sec 3	46.88	1981	West Cypress Hills Ph 1 Sec 1 Replat Lots 7 Blk 1	0.52	2004
Cedar Bluff Research Park Sec 1	110.06	1981	Capitol View Estates Resub Lot 26	5.00	2005
Willis Subd	10.00	1981	Vista Royale Ph 3	5.69	2005
Manchaca Commercial Park	12.92	1981	Rland Subd.	12.78	2005
Wild Wood Hills II	5.34	1981	Vista Royale Ph 1	38.36	2005
Texas Commerce Bancshares Subd	5.55	1981	11505 Texas 71 Ph 1 Replat Lt 10 Blk D	1.49	2005
Bluebell Ridge	87.25	1982	Spanish Oaks Replat Lot 5 Blk A	4.69	2005
DC Estates	13.13	1982	Preserve at Barton Creek Amend Lots 5,6,7, Blk A	3.84	2005
Blue Hills Estates Sec 2	5.82	1982	Lake Pointe Ph 5A Replat Lots 62, 63 Blk A & Lot 13 Blk N	0.82	2005
Oak Hill Park	1.04	1982	Bee Creek Vistas	14.01	2005
Glen-Ledge Park 1A	11.08	1982	Ranches at Hamilton Pool	823.41	2005
Glen-Ledge Park 2A	11.69	1982	Senna Hills Sec 7	28.64	2005
McDonell Estates	4.89	1982	Turner Addn.	2.65	2005
George Bauer Subd	2.02	1982	Vista Verde	7.25	2005
Levbarg Estates	9.99	1982	Harbor Hill	9.65	2005
Barton Valley Sec 8 plus 1/2 vac street	6.72	1982	Travis Settlement Sec 1 Ph 1 Resub Lots 1-31 & 45-54	17.57	2005
Barton Creek Highlands Sec 1A	4.95	1982	Rimrock Trail	14.52	2005

E-2: Past Subdivision Developments in Travis County

Name	Acres	Year	Name	Acres	Year
Lost Creek Sec 4A	5.21	1982	Barton Creek Sec G Ph 2 Amend Lots 2-3 Blk D	1.10	2005
Hills of Lost Creek Sec 4 Ph A	36.86	1982	Barton Creek Sec H Ph 2	70.41	2005
Hills of Lost Creek Sec 4 Ph B	30.90	1982	Barton Creek Sec E Ph 2	27.84	2005
Lost Creek Estates Ph 1B	24.69	1982	Summit at West Rim on Mount Larson Blk D Sec 1 Am 18-20	4.13	2005
Bunny Run One	1.88	1982	Whitethorn Subd Amend Lots 5&6	4.37	2005
Lost Canyon Ranch #2	6.81	1982	Perro Cafe	2.00	2005
Tumbleweed Place	3.00	1982	Werkenthin Sec 6 Amend Lots 31-34 Blk D	7.20	2005
Leavitt Subd	2.11	1982	Austin Lake Hills Sec 1 Resub Lot 1 Blk 49	4.15	2005
Robbin Road Addn	0.99	1982	River Place Sec 17	13.92	2005
El Seems Estates	1.98	1982	Webb Addn	2.95	2005
Freund-Keeworth Subd	2.03	1982	Preserve at Lost Gold Cave Ph 2	12.17	2005
Cielito De Catros Subd	29.66	1982	Preserve at Lost Gold Cave Ph 1	10.74	2005
John Gray Subd	4.63	1982	Rio Vista Parcel 3A	18.54	2005
Harold Hicks Subd	7.99	1982	Steiner Ranch Ph 1 Sec 7A	130.45	2005
Welch Addn	1.07	1982	Steiner Ranch Ph 1 Sec 7B	85.51	2005
Rob Roy Ph 3	37.79	1982	Longhorn Village at Steiner Ranch	55.18	2005
Stagecoach Ranch Sec 5	48.09	1983	Steiner Ranch Ph 1 Sec 10C	48.16	2005
Stagecoach Ranch Sec 1	23.88	1983	Steiner Ranch Ph 1 Sec 8E	7.14	2005
Stagecoach Ranch Sec 3	148.06	1983	River Dance Ph 2	147.49	2005
Hammett's Crossing	230.64	1983	Apache Shores Sec 6 Am Lot 2-4 Blk U	1.55	2005
Coulver Estates	156.91	1983	Scanlon Addn	1.06	2005
Hawks Hill Subd	5.76	1983	Greenshores on Lake Austin Ph 2	1.00	2005
Shady Hollow Sec 3B	49.50	1983	Greenshores on Lake Austin Ph 3	0.54	2005

E-2: Past Subdivision Developments in Travis County					
Name	**Acres**	**Year**	**Name**	**Acres**	**Year**
Hills of Lost Creek Sec 8	35.18	1983	Greenshores on Lake Austin Ph 2	42.52	2005
Crystal Mountain at Barton Creek Sec 1	88.97	1983	Greenshores on Lake Austin Ph 3	31.17	2005
Rob Roy on the Lake Sec 3	30.68	1983	Senna Hills Sec 6	31.39	2006
Rob Roy on the Lake Sec 1	224.13	1983	Spanish Oaks Sec 5B	4.41	2006
Rob Roy on the Lake Sec 2	206.84	1983	Crosswind Subd., Rev Lots 74 & 81	3.22	2006
Lake Ridge Estates Sec 3A	1.42	1983	Spanish Oaks Sec 3B	17.23	2006
Rio Robles Sec 2	90.03	1983	Belvedere Ph 1	140.49	2006
Long Canyon Ph 1A Am Lot 9 & 10	3.34	1983	Spanish Oaks Sec 7	60.32	2006
Glenlake 3 PUD	19.09	1983	Pedernales Summit Parkway Road Dedication	0.57	2006
Rio Vista Ph 1 Sec 1	2.88	1983	Vaught Ranch Sec 2	95.12	2006
Malone Addn Sec 6	1.91	1983	Sweetwater Sec 1 Blk B Lot 17 A	12.21	2006
Estates Above Lost Creek Sec 3	1.57	1983	Sweetwater Sec 2 Pedernales Summit Parkway Ph a	0.19	2006
Travis Settlement Sec 2	132.82	1984	River Dance Ph 3	65.86	2006
Travis Settlement Sec 7	69.20	1984	Cypress Creek Ranch	1151.76	2006
Ralph K. Williams	7.84	1984	Spanish Oaks Sec 3C	8.69	2006
Travis Settlement Sec 5	141.53	1984	Lodge at Hammett's Crossing	35.68	2006
Travis Settlement Sec 3	141.72	1984	Travis Settlement Ph 1 Sec 2	91.31	2006
Travis Settlement Sec 1	102.17	1984	Overlook on Bee Creek	19.68	2006
Travis Settlement Sec 4	120.26	1984	Spanish Oaks Sec 8	53.57	2006
Travis Settlement Sec 6	110.00	1984	Ranches at Hamilton Pool, Rev Lots 8,9,14,15 Blk !	182.44	2006
Turnersville Estates	39.47	1984	Amarra Drive Ph 1	34.67	2006
Arroyo Doble Sec 2	30.10	1984	Yachtman Resub Lot 5 Blk A Fleecie Purnell Estate	31.90	2006

E-2: Past Subdivision Developments in Travis County

Name	Acres	Year	Name	Acres	Year
Shady Hollow Sec 6 Ph A	28.97	1984	West Cypress Hills Ph 1 Sec 3A	28.02	2006
Shady Hollow Sec 4	33.30	1984	West Cypress Hills Ph 1 Sec 2	29.42	2006
Shady Hollow Sec 6 Ph B	28.14	1984	Noack Hill	7.96	2006
Shady Hollow Sec 6 Ph C	36.60	1984	Esquivel Subd	7.20	2006
Shady Hollow Sec 6 Ph D	26.15	1984	Draper Subd	5.00	2006
Arroyo Doble Sec 2C	16.10	1984	Pedernales Electric Coop Circle Dr Austin	66.44	2006
Granada Estates Sec 6 Amend Lots 38-39 Blk L	1.13	1984	Southwest Hills Sec 4 Am Lots 6-8 Blk B	3.04	2006
Kenny Addn	3.49	1984	Bee Cave West	9.80	2006
Watson-Fuller Oaks	4.09	1984	Rob Roy West Am Plat	33.48	2006
Ryswyk Estates	40.45	1984	Estates Above Lost Creek Amend Lots 43-45 Blk A	8.73	2006
Signal Hill Subd Ph 2	16.01	1984	Senna Hills Sec 11	23.77	2006
Summit Subd	5.00	1984	Bruton Springs Amend Lot 37, 15 Sterling Acres	8.05	2006
Critter Canyon	35.53	1984	Werkenthin East	4.00	2006
Rob Roy on the Creek Sec 1	41.21	1984	Werkenthin Sec 5 Resub Lot 44 Blk D	1.52	2006
Rob Roy on the Creek Sec 5	88.48	1984	Coldwater Sec 4 Ph B	22.01	2006
Rob Roy on the Creek Sec 6	157.32	1984	Coldwater Sec 4 Ph A	24.66	2006
Hills of Lost Creek Sec 10	26.50	1984	Westminster Glen Ph 1E Am Lot 88-89 A	4.03	2006
Barton Creek West Blk 4	183.58	1984	Panther Hollow Creek Ph 2	20.46	2006
Barton Creek West Blk 1	62.29	1984	River Place Sec 26 Resub Lot 1 Blk B	9.08	2006
Barton Creek West Blk 5	115.15	1984	River Place Sec 22 Am Lots 168 & 169 Blk A	0.51	2006
St. Michaels Academy	49.98	1984	River Dance Sec 5	66.19	2006
Bluffs of Lost Creek Am Lot 57-58	0.89	1984	River Dance Sec 4	35.50	2006
Rob Roy on the Creek Sec 3	47.88	1984	Apache Shores Sec 2 Am Lot 521, 522	0.57	2006

E-2: Past Subdivision Developments in Travis County

Name	Acres	Year	Name	Acres	Year
Green Park Sec 3	38.01	1984	FM 1626 Office Warehouse Subd	13.20	2006
Luth Subd	5.48	1984	Enclave at Alta Vista South	100.64	2006
West Rim Amend Lots 8-9	1.33	1984	Estates of Rockcliff	4.66	2006
Rob Roy on the Creek Sec 2 Lot 104 Blk A	12.55	1984	Pecan Bottom on the Lake	1.02	2006
Davenport Ranch Ph 6 Sec 1	60.26	1984	Belvedere Ph 2	93.03	2007
Bee Creek Hills Addn	41.60	1984	Spanish Oaks Sec 9	93.09	2007
Westlake Highlands Blk 1A Amend Lots 3-4	5.83	1984	Silver Spur Ranchettes Sec 2 Resub Lot 5	36.79	2007
Scott-Thomas Subd	1.72	1984	11505 Texas 71 Amend Lots 6 & 7 Blk A	0.88	2007
Josephine Subd	0.84	1984	Lakehurst Rev Lots 50-52 & 49 & .3 ac.	5.04	2007
Lednicky Subd	4.07	1984	Spanish Oaks Golf Villas	18.96	2007
Westcliff Sec 1A	59.06	1984	Amarra Drive Ph 2	89.22	2007
Long Canyon 2C	8.45	1984	Colonia Serendipity	23.49	2007
River Place Water Storage Site	11.09	1984	River Dance Sec 4 partial vacation & replat	22.94	2007
River Place Sec 1	43.73	1984	CC Carlton Subd	10.44	2007
River Place Treatment Plant	13.79	1984	Edelmon Estates	19.97	2007
River Place Sec 3	17.72	1984	Barton Creek Sec H Ph 4	103.69	2007
Signal Hill Subd Ph 1	3.51	1984	Senna Hills Sec 10	10.60	2007
Watson Park IIIA	8.37	1984	Austin Lake Estates Sec 1 Amend Lots 3 & 4 Blk 15	0.69	2007
Shady Hollow Estates Ph B	38.84	1984	Steiner Ranch Ph 1 Sec 10D	35.30	2007
Shady Hollow Estates Sec 3	10.08	1984	River Dance Ph 6A	84.96	2007
Shady Hollow Estates Sec 1	163.88	1984	River Dance Ph 6B	21.80	2007
Southland Oaks Sec 2	60.88	1984	Palomba Addn No 2 Amend Replat Lots 2-7	8.12	2007
Oak Run Estates	134.36	1984	Lynnbrook Condo Subd	3.85	2007

E-2: Past Subdivision Developments in Travis County					
Name	**Acres**	**Year**	**Name**	**Acres**	**Year**
Rob Roy on the Creek Office Park	5.22	1984	Malone Addn Sec 1 Am Lot 7&8 Blk A	1.86	2007
Rob Roy on the Creek Office Park	10.07	1984	Malone Addn Sec 1 Am Lot 7&8 Blk A	9.81	2007
Saddletree Ranch Sec 3	215.19	1985	Olympic Heights Outlot #2	0.90	2007
West Cave Estates Sec 2	69.97	1985	Belvedere 2A	3.30	2007
West Cave Estates Sec 1	51.27	1985	Steiner Ranch Ph 1 Sec 10D	25.28	2007
Woods of Bear Creek	63.91	1985	Steiner Ranch Ph 1 Sec 10D	2.93	2007
Jesse Castro No 2	9.70	1985	Steiner Ranch Lake Club	2.63	2008
Hunters Ridge	36.99	1985	Senna Hills Sec 8	12.62	2008
Arroyo Doble Sec 2B	8.13	1985	Travis Settlement Sec 4 Rev Lots 256 & 257	8.99	2008
Fleeman Estates	12.57	1985	Hollow at Slaughter Creek Sec 1	29.55	2008
Hill Country Ph 2A	116.34	1985	Woods of Greenshores Sec 1	59.78	2008
Granada Oaks	68.29	1985	Moughanni Subd	9.44	2008
Centex-Larson Subd	17.42	1985	Belvedere Ph 3	37.85	2008
Ledgeview Addn	9.80	1985	Villas on Blacksmith Cove	13.06	2008
Oak Run West	116.44	1985	Overlook at Pawnee Pass	3.18	2008
Maxson-Grant Subd	10.04	1985	Slaughter Creek Acres Resub Lot 1 Blk D	5.05	2008
Rob Roy on the Creek Sec 8	8.39	1985	Miller Subd	0.47	2008
Barton Club Drive	3.05	1985	Belvedere Ph 4	52.51	2008
Barton Creek West Blk 3	173.42	1985	Palisades West Amended Plat of the Amended Plat	22.35	2008
Barton Creek West Blk 2	124.60	1985	River Dance Ph 7A	39.71	2008
Barton Creek West Blk 1A	7.42	1985	Cherry Mountain Ph 2 Resub Lots 1-3, 9, 10	12.09	2008
Estates of Barton Creek Sec 2A	10.10	1985	River Dance Ph 7B	41.24	2008
Estates Above Lost Creek Amend Lot 39 & 40	2.35	1985	Vincent Subd	4.51	2008

E-2: Past Subdivision Developments in Travis County					
Name	**Acres**	**Year**	**Name**	**Acres**	**Year**
Hills of Lost Creek Sec 2 Am Lot 12-13	0.78	1985	Greenshores on Lake Austin Ph 2 Am Lots 32, 33, 34, 39	3.12	2008
Voelzel Acres	2.35	1985	Senna Hills Sec 9	11.92	2009
Lakeplace Subd	9.38	1985	Hilltop Manor Rev Lot 1 Blk FFF & 19 RR Twin Lake Hills	0.72	2009
Tierra Madrones	47.15	1985	Amarra Drive Ph 3	233.43	2009
BF&Q Subd	2.21	1985	RGK Commercial Unit A Lot 15 B Blk 2	2.12	2009
Mount Larson South Ph 2A	17.70	1985	Bee Creek Hill Estates	8.92	2009
Little Bee Creek Estates	3.19	1985	Schuknecht Subd	4.79	2009
St Tropez PUD	17.47	1985	Grace Hill	2.92	2009
Rockcliff Estates PUD	13.87	1985	Lone Star Bank Subd	9.70	2009
Long Canyon 2B	386.28	1985	Sutter Hall Subd	10.81	2009
River Place Sec 9	65.95	1985	River Terrace IV	2.17	2009
Westminster Glen Ph 1	107.59	1985	Belvedere Ph 1 Rev Lots 38, 40 Blk D	2.52	2009
Hennig Heights I	35.90	1985	Belvedere 2A Rev. Lots 107, 108 & 109 Blk A	8.46	2010
Shady Hollow Estates Sec 2 Amended	99.16	1985	Montebella Subd	41.82	2010
Guajardo Subd	12.41	1985	Belvedere Ph 5	15.60	2010
Malone Addn Sec 7	10.19	1985	Tres Vistas Rev Lots 23 & 24	2.13	2010
Highway 290 West Addn	5.98	1985	Noack Hill, Rev. Lot 3,4 Blk A	2.13	2010
Bee Creek Hills Addn Lot 1A	1.96	1985	Summit 56	0.36	2010
Malone Addn Sec 7	4.58	1985	Touba Estates	15.98	2010
David S. Minter Addn	0.54	1985	Crooked Cedar Ranch	10.02	2010
Malone Addn Sec 7	4.50	1985	O&A Guerra Subd	2.98	2010
The Preserve	48.15	1985	Sweetwater, Pedernales Summit Parkway Sec 1	7.29	2010

E-2: Past Subdivision Developments in Travis County					
Name	**Acres**	**Year**	**Name**	**Acres**	**Year**
River Place Sec 5	15.04	1985	Angelwylde Sec 3 Resub Lot 9	40.35	2011
Mason	5.20	1986	Rocky Creek Ranch Sec 1 Replat	159.15	2011
West Cave Estates Sec 4	282.64	1986	Sola Vista Sec 1	1.02	2011
Fitzhugh Ranch Sec 1	59.02	1986	Ridgeview Ph 1	59.83	2011
Texana Oaks	24.87	1986	Belvedere 2A Rev. Lots 31, 32 Blk D	2.37	2011
Southneast Park Addn	4.96	1986	NOAH ESTATES	6.49	2011
St. Alban's Addn	14.74	1986	Lake Pointe Ph 1B Rev Lots 6,7 Blk Q, Lot 7A Blk Q Ph 1E	0.60	2011
Enclave at Shady Hollow	6.07	1986	Travis County EMS #5	13.61	2011
Appaloosa Run Sec 1A	11.51	1986	Travis Settlement Sec 6, Rev 368-370 pt Lots 367, 371	10.31	2011
Overlook Estates Ph 1	80.13	1986	West Cypress Hills Ph 1 Sec 4 Cypress Ranch Blvd	2.94	2011
Ramar Addn	1.51	1986	West Cypress Hills Ph 2 Sec 1 Cypress Ranch Blvd	1.41	2011
Lost Creek Sec 2 Am Lot 19-20	1.21	1986	West Cypress Hills Ph 3 Sec 1 Cypress Ranch Blvd	1.65	2011
Whitehorn Subd	10.70	1986	Hazy Hills Office Park	18.57	2011
Toro Canyon	9.99	1986	West Cypress Hills Ph 1 Sec 4a	31.32	2011
Smith-Holley Addn	2.78	1986	Kellywood Estates Sec 2 Resub Lot 2	4.06	2011
Bee Creek Hills Addn Lot 29A	1.05	1986	Steiner Ranch Ph 1 Sec 10D Resub 303-315 Blk A & Lot 4 Blk F	17.94	2011
McBrine Subd	7.71	1986	Caldwell-Abeyta	7.76	2011
Lake Shore Annex #2	2.99	1986	Sweetwater Sec 1 Village G 1	20.98	2012
Austin Lake Hills Sec 3 Amend Lots 13 & 14	0.88	1986	Sweetwater Sec 1 Village G 2	19.25	2012
Sunrise Terrace	2.05	1986	Ragan Subd	9.08	2012
Oak Shores on Lake Austin Sec 1	9.71	1986	Reserve at Lynnbrook	11.71	2012

E-2: Past Subdivision Developments in Travis County					
Name	**Acres**	**Year**	**Name**	**Acres**	**Year**
Oak Shores on Lake Austin Sec 3	8.77	1986	West Cypress Hills Ph 1 Sec 4a Rev Lots 5,6,7,8,9 Blk C	5.56	2012
Long Canyon Ph 1A Am Lot 12 & 13	2.38	1986	Bart Cr Sec H, am 54 B Ph 2 & Lt 12 Blk G Est Ab Lost Cr	3.46	2012
River Pointe Subd	70.66	1986	Overlook Estates Ph 2	40.94	2012
Bokros Buffer Subd	3.93	1986	Rocky Creek Ranch Sec 2	66.45	2012
Oak Shores on Lake Austin Sec 2	4.00	1986	Spicehenge Subd.	22.06	2012
Lake Country Estates	21.59	1986	Amended Spanish Oaks Sec 3C Lot 35	0.79	2012
Wild Basin Point	12.25	1986	Sweetwater Sec. 1 Village H	14.33	2012
Fairway Oaks Resub Lots 1-11	7.77	1986	Sweetwater Sec 1 Village H2	3.97	2012
Caudill Addn	0.89	1986	Sweetwater Sec 2 Vilage F-1	11.36	2012
Hacienda Del Corazon	24.88	1987	Stoneridge Park	4.49	2012
Rob Roy Rim Condos	41.35	1987	Marbella Subd	117.26	2012
Crystal Creek Amend Lots 7, 9-11	8.26	1987	Sweetwater Sec 1 Village A Replat	9.64	2013
Baldwin Subd	5.99	1987	Belvedere Ph 3 Rev Lots 83 & 84	2.03	2013
Common Ford Commercial Park	7.63	1987	River Place Sec 9 Lot 1 Resub	15.29	2013
Eanes Ridge	9.32	1987	Sola Vista Sec 2	37.18	2013
Loma Graciosa Subd West Lake Green Am Lots 5 & 6 Lot 2	15.56	1987	Belvedere Ph VI	41.69	2013
Flint Rock Hill Subd	10.33	1987	Spanish Oaks Sec 11	45.65	2013
Geisler Addn	6.13	1987	West Cypress Hills Ph 2 Sec 2	6.94	2013
Monte Verde Subd	10.82	1987	Montebella Sec 2	3.09	2013
Fox Creek	47.85	1987	West Cypress Hills Ph 1 Sec 4a Rev Lot 4 Blk C	0.20	2013
Lake Shore Addn Resub Pt Lots 20, 21	0.73	1987	Sola Vista Sec 3	35.79	2013
Tierra De Las Brisas	9.91	1988	Vistancia Sec 2	22.87	2013

E-2: Past Subdivision Developments in Travis County					
Name	**Acres**	**Year**	**Name**	**Acres**	**Year**
Coldwater PUD Sec 2	77.18	1988	Vistancia Sec 3	10.07	2013
Circle Drive Subd	2.93	1988	Belvedere Ph VII A	15.51	2013
Lewis Mountain Ranch Ph 1	87.51	1988	Sweetwater Ranch Sec 2 Village F2	10.51	2013
Westlake Hills Presbyterian Church	35.54	1988	Bella Colinas Sec 1	32.33	2013
Wild Basin Subd	2.38	1988	Agroland	4.75	2014
SUBTOTAL ACRES	20,230		Preserve at Thomas Springs Road	28.32	2014
			SUBTOTAL ACRES	20,298	
			TOTAL ACRES	**40,528**	

Source: Travis County Transportation and Natural Resources Department, 2014.

Attachment E-3

Emerging Projects – City of Austin

E-3: Emerging Projects as of February 2017- City of Austin*	
Name	**Description**
1300 Dittmar	The 42-acre site will have 233 attached and detached homes that will be built over 12 years.
1301 West 5th Street	The 1.64-acre site could have 230 multifamily apartments.
1512 Forest Trail Apartments	This 0.79-acre site will have 19 two-br apartments in three buildings to replace the two existing houses.
2300 Enfield Road	The 1-acre site will have 36 2-bedroom multifamily units.
2712 & 2800 Del Curto Rezoning	The 2-acre site could have single family condominiums.
300 Pressler	The 1.19-acre site will have 112 multifamily residential units.
3100 Manchaca Road	The 3-acre site will have 49 multifamily units.
315 Pressler	The 1-acre site will have 107 multifamily residential units.
4411 Soco	If approved, the 2.9-acre site could have 300 multifamily residential units.
5100 South Congress	The 18.2-acre site will have 352 multifamily apartments.

*City of Austin Emerging Projects are depicted on **Figure 5** in **Attachment A** based on available City of Austin GIS data as of February 2017.

E-3: Emerging Projects as of February 2017- City of Austin*	
Name	**Description**
6500 Manchaca	The 6.349-acre site will have 134 residential townhouses, 9,000 sq.ft of specialty retail, 4,000 sq.ft of office space and 5,000 sq.ft of restaurant space in the form of 4 vertical mixed use buildings.
6709 Circle S Road Rezoning	The 1.18-acre site will have 10,000 sq.ft of commercial retail space.
6800 Manchaca Rd	The 4.6-acre site will have 46 multifamily residential units.
7701 S Congress	The 5.38-acre site will have 81,600 sq.ft of industrial space.
7720 & 7800 South 1st Street	The 1.6-acre site will have commercial uses.
7804 Cooper Lane	If approved, the 1.38-acre site will have duplex residential units.
7805 Cooper Lane	The 3.825-acre site will have 41 residential multifamily condominiums.
8801 S Congress Ave Land Use	The 25.9-acre site will have a 130,000 sq.ft grocery store.
9701 Westgate Blvd. (with/resub of SP-2015-0233C)	The 2.09-acre site will have 14 residential units in three buildings.
9710 Shallowford	The 4.22-acre site will have warehouse space.
AAA Storage Bradshaw (with/resub of SP-2015-0333D)	The 14-acre site will have five self-storage buildings with 80,779 sq.ft of space.

E-3: Emerging Projects as of February 2017- City of Austin*	
Name	**Description**
Abel's Rib House	The 1.06-acre site will have around 22,800 sq.ft of office space, and 9,700 sq.ft of retail space.
ACE Hardwood	The 4.33-acre site will have warehouses.
Addison Grove	The 26.43-acre site will have a 7,500 sq.ft building and will be developed as a wedding venue.
All Saints Presbyterian Church	The 6.7-acre site will have a 43,690 sq.ft religious assembly space.
Amarra	This project includes 132 single family homes on 365 acres.
Anonymous Brewery	The 5.61-acre site will have around 60,000 sq.ft of commercial space.
Arnold Oil	The 14.92-acre site will have 111,000 square feet of an industrial facility warehouse space along with attached office and retail space.
Aspen Heights	The 20.8-acre site will have 346 apartment units in six multifamily apartment buildings.
Austin ARC Women's Unit and Family Transitional Housing	The 15.08-acre site will see the addition of a Women's Adult Treatment Center and Family Transitional Housing.
Austin Onion Creek Fire & EMS Station	The 2.5-acre site will have a fire and EMS Station.
Austin Seventy-One	The 30.9 - acre lot will have 13 single family homes and 15.9 acres will be used for commercial uses.

E-3: Emerging Projects as of February 2017- City of Austin*	
Name	**Description**
Autumn Wood; Amended Plat	The 3.79-acre site will have 20 single family residential units.
Avana	This 1,020 acre upscale housing development will include nearly 800 homes, a 250-room resort hotel with 140 condominiums, 24 single family villas and an 18 hole golf course at build out, scheduled about ten years from now.
Avana Phase 2	This 149.12-acre tract will have 229 single family residential units.
Aviara	The 39.5-acre site will have 216 single family condominiums.
Backyard	Redevelopment plans include six movie and television sound stages, three office buildings, a hotel with 150 rooms, a 6,000-capacity amphitheater, another 2,000-capacity amphitheater, restaurants, retail, parking garages, and a trail system.
Balfour Tract (6D Ranch)	A residential and retail development on 63 acres.
Barton Creek Office Park	This project will add 300,000 square feet of office space in two buildings on 13.6 acres.
Barton Creek Section N Multi-Family	The 27.4-acre site will have an apartment complex.
Bella Fortuna PP	The 158-acre site will have 450 single family residential units on 93.86 acres, an acre of commercial retail uses and 36 acres of open space.
Big 4 Auto Salvage	The 1.2-acre site will have a 15,035 sq.ft metal building for auto salvage.

E-3: Emerging Projects as of February 2017- City of Austin*	
Name	**Description**
Big Valley Subdivision	The 107 acres of farm land will have residential condominiums, multifamily residential units, office, retail, parkland, medical and hotel uses.
Blackstone Vineyard	This 209-acre site will have 153 residential units.
Bluebonnet Residence	The 0.7-acre site will have 14 detached residential units
Bluebonnet Studios	The 0.6-acre site will have a 4-story apartment building with 120 studio apartments.
Bluff Springs RV Storage	The 5.54-acre site will have a storage facility for recreational vehicles.
BMW of Austin	The existing movie theater on the 14.6-acre site will be demolished to make way for a car dealership.
Boulevard City Homes	The 1.05-acre site will have 18 multifamily residential units.
Bowie High School Practice Fields	The 4-acre site will have two practice fields for Bowie High School.
Breakwater Subdivision	The 26.8-acre site will have 21 single family residential units on 24.68 acres.
Broadstone Scenic Brook	The 46.32-acre site will have retail on 6.5 acres and multifamily apartments on 39.7 acres.
Brodie 31 PUD	This 32-acre site will have 127,865 square feet of retail uses.
Buckingham Estates Condominiums	The 15.95-acre site will have residential condominiums.
Bungalows, The	The 1.5-acre site will have 14 residential units.

E-3: Emerging Projects as of February 2017- City of Austin*	
Name	**Description**
Calvert House	The 5.78-acre site will have a restaurant.
Carma - Pilot Knob	The 2,124 acre Pilot Knob project will be composed of five MUDs, and will include 5,660 single family units; 2,320 townhomes; 6,370 multifamily units; more than 3.8 million sq.ft of commercial space as well as a 40-bed hospital and an 850-room hotel.
Carpenter, The	The 1.38-site acre will have a hotel.
Cascades at Onion Creek, formerly Fox Hill Subdivision	The 215 acre site will include 467 single family residential units; 350 multi-family units; and 63 acres of open space.
Cebolla Creek	The 70.8-acre site will have 195 single family residential units.
Centex Produce	The 1.83-acre site will have a 13,000 sq.ft warehouse.
Chisolm Trail Single Family Condominiums	The 35-acre site will have around 246 detached single family condominium houses.
Circle "C" Ranch Office Complex	The 2.8-acre site will have 15,800 sq.ft of office space.
Circle C Apartments	The 12.26-acre site will have 240 multifamily residential units.
Circle C Child Development Center	The 6-acre site will have a 22,220 sq.ft daycare center.
Circle C Golf Estates Phase II	The 44.7-acre site will have 79 single family homes.
Circle C Ranch Tract 2B	The 12.3-acre site will have 14 single family homes.

E-3: Emerging Projects as of February 2017- City of Austin*	
Name	**Description**
Circle C Ranch Tract 8C	The 14.2-acre site will have eight single family residential units.
City of Austin - Austin Water Utility	Austin Water Utility is planning some construction at the existing facility.
Clawson Multi Family	The applicant is proposing development that consists of 40 units in 7 buildings with associated parking.
Clawson Townhomes	The 1.88-acre site will have 15 residential units.
Collings Guitars Phase II	Two additional buildings with 31,000 square feet of commercial space are proposed on this 13-acre site.
Comfort Suites Hotel South	The 1.6-acre site will have an eighty room hotel.
Cooper Lane Condominiums	The 9.68-acre site will have 65 detached residential condominiums.
Cottages of Lantana	The 8.8-acre site could have 41 single family condominiums.
Covered Bridge PUD	The 38-acre site will have 250 apartments; 8,000 sq.ft of retail; 8,000 sq.ft of restaurant space; 16,000 sq.ft of office space; an assisted living center with 150 beds and 2 single family residential units.
CR-163 Subdivision	The 60.6-acre site will have commercial uses.
Creeks Edge	The 56.8-acre site will have 30 single family residences on 42.45 acres and 12.61 acres of greenbelt area.

E-3: Emerging Projects as of February 2017- City of Austin*	
Name	**Description**
Cypress Creek at Ledge Stone	This site will have 234 single family homes and 244 multifamily apartments. The apartments will be rented to people who make less than 60% of MFI.
Dakota Springs (aka Marbridge Estates)	This 112.5 acre subdivision will have 301 single family homes, with 33.5 acres dedicated to open space.
Davis Lane Garden Homes	The 1.39-acre site will have 12 garden homes.
Decorum Stone (Withdraw/Resubmittal of SP-2015-0002C)	The site will have around 12,000 sq.ft of industrial space.
Dittmar Office Park	The 5.8-acre site will have around 74,000 sq.ft of medical office and office space.
Double Creek Residences	If approved, the 35-acre site could have 750 multifamily apartments, and over 250,000 sq.ft of commercial space.
Double Creek Village Blk B Resub of Lt 1, Blk B; Resubdivision of Lot 1C	The 14.34 acre lot will have multifamily apartments.
Double Creek Village; Resub Plat of Lot 1A of Resub of Lot 1 Block "B"	The 44.8-acre site will have multifamily apartments on 27.65 acres and retail on 17.22 acres.
Duke's Adventure Golf	The 1.3-acre site will have a mini golf course.
Edelmon Estates	The 7-acre site will have two single family homes.

E-3: Emerging Projects as of February 2017- City of Austin*	
Name	**Description**
Ellis Oaks	The 3.2-acre site could have single family residential units.
Encino Trace	A six story parking garage and 332,000 sq.ft. of office space in two buildings will be constructed on the 54-acre site.
Enclave at Oak Parke, The	The 12.8-acre site could have single family residential units.
Escondera Section 4	the 8.76 acre parcel will have 35 residential condominiums.
Estancia Hill Country	This 600-acre site will have 1,550 apartments; 750,000 sq.ft of industrial space; 905,000 sq.ft of office space; a 405,000 sq.ft shopping center; and 737 detached single family housing units.
Exposition Multifamily (former 3215 Residences)	The 1.72-acre site will have 25 multifamily residential units.
Fiesta Tortillas Expansion	About 18,000 square feet of manufacturing space will be added to the existing facility on this 2.95-acre site.
Foremost Zoning	If approved, the 14.6 -acre site could have 330 multifamily residential units.
Fossil Rim Road	The 3.75-acre site will have single family residential units.
Fox Hill Apartments	This 22-acre site will have 288 multifamily apartments.

E-3: Emerging Projects as of February 2017- City of Austin*	
Name	**Description**
Freedom Park	The 3.27-acre site will have an 19, 513 square feet office-warehouse development in two buildings.
Freeport Tech South	The 33.35-acre site will have industrial uses.
Fusion Flats	This 6.23-acre parcel will have 106 multifamily units and around 9,800 sq.ft of retail space.
Garcia's PP&M Subdivision	The 3-acre site will have commercial retail uses.
Garden Terrace Phase 3	The 5.77-acre site could have multifamily residential units.
Garrison Park Business Center	The 1.18-acre site will have 9,850 sq.ft of office space.
Golf Cove Rezoning A	If approved, the 1.66-acre site will have single family homes.
Goodnight Manchaca	The 2.82-acre site will have 31,500 sq.ft of commercial space.
Goodnight Ranch	The 703-acre site will have 1,192 single family units; 2,645 apartments; 696 townhomes, an elementary school for 800 students; a middle school for 1,100 students as well as a 1,260,000 sq.ft shopping center and a 15,000 sq.ft community center.
Great Commission Baptist Church	The one-acre site will have a church.
Greyrock Ridge Commons (formerly Wildflower Commons)	The 177 acre site will include 387 single family homes on 103 acres and 55 acres of open space.

E-3: Emerging Projects as of February 2017- City of Austin*	
Name	**Description**
Group 1 Automotive - Proposed Maxwell Ford Collision Center (W/R SP-2015-0058C)	The 3.06-acre site will have a 31,970 sq.ft collision center.
Grove, The	The 9.2-acre site could get 24 multifamily units in addition to the existing 184 multifamily units.
Hamilton I PP	The 443-acre site will have 225 residential lots on 325 acres.
Harlan Rezoning	This 0.396-acre site could have mixed use.
Harper Park	The 17-acre site could have 250 multifamily residential units.
Harper Park Hotel Tract	A 118-room hotel will be constructed at this 5.19 acre site.
Harris Ranch	The 102-acre site will have 350 single family residences, with 7.96 acres for retail.
Heritage Oaks	The 5.3-acre site will have 48 single family residential units.
Hetherly Tract	The 58-acre site could have 97 residential units.
Hills of Shady Hollow, The	The 77-acre site will have 208 single family residences, 35 acres of greenbelt and 5 acres of retail uses.
Hollow at Slaughter Creek, The	The 40-acre site will have 216 residential units.
Holt Cat Subdivision	The 15.6-acre site will have office uses.

E-3: Emerging Projects as of February 2017- City of Austin*	
Name	**Description**
It's About Thyme	The 43.9-acre site will have a garden center.
KB-Sheldon 230 (Smart Housing)	This 236-acre site will have 925 single family homes and 46.6 acres of open space/
Keesee Tract	The 7.45-acre site will have 236 multifamily residential units.
La Mexicana Supermercado	The 4-acre site will have around 165,600 sq.ft of retail space.
La Vid Urban Homes	The 4.34-acre site will have 37 duplex condominium residential units.
LaCrosse at Circle C Residences	The 8.28-acre site will have 25 residential units.
LaMadrid Apartments and Townhomes	The 6-acre site will have 95 multifamily apartments.
Lamar Flats	The 2.62-acre site will have a vertical mixed use building with 308 residential units.
Landmark Conservancy	The 22-acre site will have 240 multi family units.
Lantana	This 16-acre site will have 73,107 sq.ft of medical office space.
Lantana Tract 28	The 27-acre site will have eight apartment buildings with 300 residential units.
Lantana Tract 32	The 46.7-acre site will have 428 multifamily residential units in 17 apartment buildings.
Lantana Tract 33	The 27.56-acre site will have 370 multifamily apartment units.

E-3: Emerging Projects as of February 2017- City of Austin*	
Name	**Description**
Las Casa Verdes	This 2.19 acre project with 20 single family homes will meet the standards of the Austin Green Building Program.
Las Maderas Section 2	The 5-acre site will have 28 residential units.
Laurelwood Commons	The 1-acre site will have a retail building.
Laurelwood Plaza	The 5-acre site will have 16,000 sq.ft of retail and office space.
Laurelwood Storage	The 4.64-acre site will have a 123,250 square feet storage facility.
Legends Way	This 108.25 acre subdivision will have 289 single family homes.
Lenox Industrial Park	This project will include multi-family and industrial uses.
Lenox Springs Phase 1	The 19.5-acre site will have 200 multifamily residential units in 18 buildings.
Lightsey	The 4.7-acre tract will have 40 residential units.
Live Oak at Southpark Meadows	The 19-acre site will have 330 multifamily apartments.
Live Oak Trail	This 8.6 acre site will have 40,200 sq.ft in office condominiums space
LOCO-Motion Inflatable Play, LLC	The 1.2-acre site will have a 22,000 sq.ft children's indoor play area.
Lone Star Bank	The 9.6-acre site will have 20,932 sq.ft of bank, office and retail space.

E-3: Emerging Projects as of February 2017- City of Austin*	
Name	**Description**
Lost Creek	The 1.44-acre site could have 15 detached townhome units.
Malone Preliminary Plan	The 40.48-acre site will have 166 single family units on 20 acres, and 13 acres of greenbelt.
Manchaca Crossing Retail Center	The 1.49-acre site will have a 10,200 sq.ft retail use building.
Manchaca Industrial Center	The 1.25 site will have 13,510 sq.ft of office-warehouse space in two buildings.
Manchaca Road Business Park Phase B	The 3.96-acre site will have 48,900 square feet of warehouse and office space.
Marbella Section 3	The 111.08-acre site will have 1,116 multifamily residential units.
Marbella Subdivision - Bluff Springs Estates	This 117 acre site will have 712 apartment units and 11,000 sq.ft of office space.
Marcy Hill	The 0.851-acre site will have four single family units.
Mariposa Montessori School	The 7.28-acre site will have a 21,900 sq.ft private school.
Marx Property Fill and Drainage Improvements Plan	The 8-acre site will be a fill site.
Masonwood 71 & Terra Vista PP	The 147.6-acre site will have 294 residences.
Meadows at Double Creek	The 30.6 acre lot will include 126 single family residences as well as retail on 3.2 acres.
Meridian	666 single family homes will be built on 194 acres of the 454-acre subdivision, 199 acres have been set aside for open space.

E-3: Emerging Projects as of February 2017- City of Austin*	
Name	**Description**
Meridian Village	The 15.82-acre site will have commercial retail uses.
Mockingbird Apartments	The 1.07-acre site will have 15 residential units.
Moontower Offsite parking	The 4-acre site will be used for off-site parking.
New Theatre @ Zach Scott	This 27.21-acre site will have a single-rake 418 seat theater.
North Bluff	If approved, the 1.233-acre site will have 16 single family residential units.
North Bluff 2	The 4.21-acre site will have 52 single family homes.
North Bluff Apartments	The 6.4 acre site will have 118 condominiums.
Nutty Brown Business Park	The 7.8-acre site will have office and retail buildings.
Oak Hill Emergency Center	The almost 1-acre site will have an emergency center.
Oakhill Medical Center	The 4.49-acre site will have 12,800 sq.ft of medical office space.
Old Bee Cave Rd. Subdivision	If approved, the 10.16-acre site will have two single family residential units.
Old Bee Caves Office Building	The 8.8-acre site will have a 15,535 sq.ft office building.
Old Bee Caves Road Condos	The 20-acre site will have 76 duplex units and 15 single family residential units.
Oporta Zoning	If approved, this 0.86-acre site could have 12,000 sq.ft of retail space.

E-3: Emerging Projects as of February 2017- City of Austin*	
Name	**Description**
Overlook Estates	The 41-acre site will have 39 single family homes and a 6-acre greenbelt.
Overwatch Phase 2	A 3-acre portion of the site will have a 43,200 sq.ft office building.
Parking Garage Addition for Judges Overlook	The 5-acre site will have a parking garage.
Parkside Community School	The 12.2-acre site will have a private elementary school.
Parkway Village	This 23 acre lot will have retail uses.
Pleasant Valley	The 3.63-acre site will have commercial uses.
Precision Sports Facility	The 4.44-acre site will have an indoor sports facility.
Preserve at Thomas Springs Road, The	This 38.465-acre site will have 32 single family residential units.
Rancho Garza Preliminary Plan	The 34.7-acre site will have multifamily apartments, a hotel, office space, as well as retail space.
Ravenscroft Commercial	The 4-acre site will have 11,790 sq.ft medical office, a 4,000 sq.ft convenience retail, a 5,000 sq.ft restaurant, and 7,723 sq.ft of general retail.
Regency Park	The 2.9-acre site will have 96,500 sq.ft of office space.
Regents West Campus	The 18.27-acre site will have athletic fields and a sports building.
Remington Ranch	The 1.28-acre site will have an animal boarding facility.

E-3: Emerging Projects as of February 2017- City of Austin*	
Name	**Description**
Reserve at Lynnbrook	The 11.5 acre development will have 34 single family residential units.
Revised Springfield Sections 2,3,4,5,10&11 Preliminary Plan	The 20.15-acre site will have 504 multifamily residential units.
Ridgeview	The 93-acre site will include 197 single family homes and 36.6 acres of greenbelt/open space area.
Ring Tract	The 87-acre site will have 249 single family residential units on 38 acres, and 33.2 acres of open space.
River Ridge Estates Ph. 2 & 3	The 43.72-acre site will have 178 single family homes.
Rob Roy	The 6.5-acre site will have two single family residential units.
Rocky Creek Ranch MUD	The 468-acre planned residential community is expected to have 400 homes and 325 acres of open space. The project is being developed by Hillwood Development and Spanish Oaks. The development will take place over four phases.
Saint Elmo Public Market	The 9.45-acre site will have a hotel; 45,000 sq.ft of restaurant space; about 25,500 sq.ft of retail space, and 229,000 sq.ft of office space.
Salem Center	This 8.18-acre lot will have 42 single family homes.
Samdorosa Communities	The 1.7-acre site will have an office / apartment development.

E-3: Emerging Projects as of February 2017- City of Austin*	
Name	**Description**
Sames Red Barn Automotive	The 1.22-acre site will be developed for automotive sales.
Second Amended Plat of Lots 3-7, Blk. B, Commerce Center South Section Two	The 30-acre site will have commercial uses.
Seton Southwest Expansion	A 7,190 sq.ft expansion to the existing medical facilities will be built on the 58 acre parcel.
Seven Oaks Office Park	The 15-acre site will have office buildings.
Shady Hollow Gardens	This 35.5-acre multifamily subdivision will have 144 townhomes.
Skywest Ranch	The 98-acre site will have 79 single family residential units.
Slaughter 100 tract 14A	This 36 acre site will have office uses.
Slaughter Lane Retail Center W/R SP-2015-0362C	The 2.62-acre site will have 22,185 sq.ft of retail and restaurant space.
Smithfield Condominiums	The 8.8-acre site will have 97 multifamily triplex and fourplex units.
SOCO II Apartments	The 6.09-acre site will have 268 multifamily residential units.
Songhai at West Gate	If approved, the 5.15-acre site could have 146 multifamily units.
South Austin Beer Garden	The 1-acre site will have a beer garden.

E-3: Emerging Projects as of February 2017- City of Austin*	
Name	**Description**
South Austin Medical Center Medical Office Building	The 17.1-acre site will see the addition of a 59,466 sq.ft medical office building.
South Congress @ Little Texas Lane Commercial	If approved, the 2.11-acre site will have convinience storage.
South Congress Residences	If approved, the 2.81-acre site will have 253 multifamily residential units as well as almost 5,000 sq.ft of retail space.
South IH 35 Mixed-Use Apartment Community	If approved, the 9.43-acre site could have 380 multifamily apartments.
South Park Crossing Apartments	The 16.4-acre site will have 308 multifamily units.
South Six	If approved, the 6.5-acre site will have industrial development.
South Urban Lofts	The 2.69-acre lot will have four 6-story mixed use buildings with 149 residential units, 22, 692 sq.ft of retail use and two parking garages.
SouthPark Industrial	The 26.6-acre site will have around 95,100 sq.ft of office space, and 255,100 sq.ft of warehouse space.
Southpark Meadows	This master planned retail-residential project by Endeavor Real Estate Group LLC is being built on 425 acres, and will include 1.6 million sq.ft of retail space, 650 multifamily units, 330 single family units, 110 townhomes, office and medical uses.
Southwest Parkway Office Building	The 8.6-acre site will have 8,340 sq.ft of office space.

E-3: Emerging Projects as of February 2017- City of Austin*	
Name	**Description**
Spanish Oaks Sec 7 PP	The 59-acre site will have 41 residential units.
Spanish Oaks Sec XI PP	The 51.7-acre site will have 29 residences.
Springfield 7, 8 & 9	The 89 acre site will have 337 single family units and 20 acres of greenbelt/open space.
St. Andrew's School Miller Tract	The 93-acre site will have commercial uses.
St. Gabriel's Catholic School, Building B	The proposed building on the 31-acre site will add classroom space for the existing school.
Stablewood Drive	A city roadway has been proposed for this 2.35-acre site.
Starpark Village	The 8.12-acre site will have 184 multifamily apartments. All apartments will serve households at or below 60% Median Family Income.
Stassney Lane Townhomes	The 20-acre site will have 116 single family townhomes.
Stately Hill Condominiums	The 9.5-acre site will have 60 single family residential condominiums.
Still Waters	The 22.73-acre site will have 512 multifamily apartment units.
Stoneridge	The 2.53-acre site will have office buildings.
Sunfield	Scarborough Lane's 2,700 acre development will be a master planned community with a mix of single family, multifamily, commercial and light industrial. The site will have 5,311 single family homes and 1,660 multifamily homes on 1,087 acres.

E-3: Emerging Projects as of February 2017- City of Austin*	
Name	**Description**
Sunset Ridge	The 9.6-acre site will have 199,800 sq.ft. of office space.
Sunset Trail Residences	If approved, this 2.75-acre site could have 60 multifamily units.
Sweetwater Ranch	Around 1,800 homes will be built on the 1,400 acre site. The scenic ridges and canyons near the lake will be preserved as a greenbelt, according to Wheelock Street Capital LLC.
Tarlton 360 Townhomes	Plans for the 16-acre former movie theater site include a 75,819 sq.ft office building; a 8,300 sq.ft shopping center; a 3,500 sq.ft restaurant as well as 229 residential units.
Taylor Estates	The 23.7-acre site will have 77 single family homes.
Terrace Sec. 5 of Lots 1 & 2 Blk A, Terrace Sec.7 Lots 1 & 2 Blk B; Amended Plat	The 42-acre site could have commercial uses.
Texas Oaks Three Resubdivision of Lot 1 Blk A; Amended Pla	The 10-acre site will have commercial - retail uses.
Tipco Subdivision	The 85-acre site will have 24 single family residences.
Tranquilo Trail Park	The 0.45-acre site could be a park.
Transwestern Data Ranch	This 36-acre site within the Expo Business Center industrial area will have a 249, 518 sq.ft data center.

E-3: Emerging Projects as of February 2017- City of Austin*	
Name	**Description**
Travis County Emergency Services District #5 Subdivision	
Travis County MUD 4 South Wastewater Treatment Plant	A wastewater treatment plant will be built on this 34-acre site.
Travis County MUD No. 4 Barton Creek Section N Regional Stormwater Mgmt. Wet Pond	The 9.2-acre site will have a stormwater management facility.
Trinity Place Apartments	This 9.5-acre site within the Belterra master planned community will have 152 apartments , with 32-one bedroom apartments, 104-two bedroom apartments and 16-three bedroom apartments.
Valley View Condominiums	The 1.64-acre site will have 13 condominium units.
Value Place Hotel	The 1.8-acre site will have a 124-room hotel.
Vega Office	The 4.2-acre site could have a 34,000 sq.ft office building.
Venue at Slaughter	The 8.8-acre site will be developed into an event venue.
Village on Congress	This mixed use project will include 108 multifamily townhomes and 5,461 sq.ft of retail and restaurant space.
Villas at Vinson Oak	The 1.9-acre site will have 20 residential units.

E-3: Emerging Projects as of February 2017- City of Austin*	
Name	**Description**
Villas of Barton Ridge Estates Section II	The 39.93-acre site will have 39 single family residential units.
Vistas of Austin, The	The 158-acre site will have 669 single family homes
Vistas of Western Hills, The	The 1.91-acre site could have multifamily apartments.
Waterleaf Medical At Davis Lane-Autumn Leaves of Southwest Austin	The 5.8-acre site will have a 54-bed assisted living facility.
West 5th Street Self Storage	The 1-acre site will have 194,822 sq.ft of self storage space.
West Oak	The 6.73-acre site will have 38 single family condominiums.
Western Oaks Retail Center	An office building will be added on to the existing development on this 15.44-acre site.
Westgate and Davis Lane	The 6.11-acre site will have 34 residential condominiums.
Westgate Grove	This 9.39 acre development will have 61 single family detached condominium units.
Westgate Grove Phase II	The 6.72-acre site will have 88 multifamily units.
Westlake Residential	The almost 20-acre site will have multifamily residential units.
Westrock	The 5.43-acre site could have single family condominiums.
William Cannon Senior Housing	The 9.14-acre site will have 259 multifamily residential units.

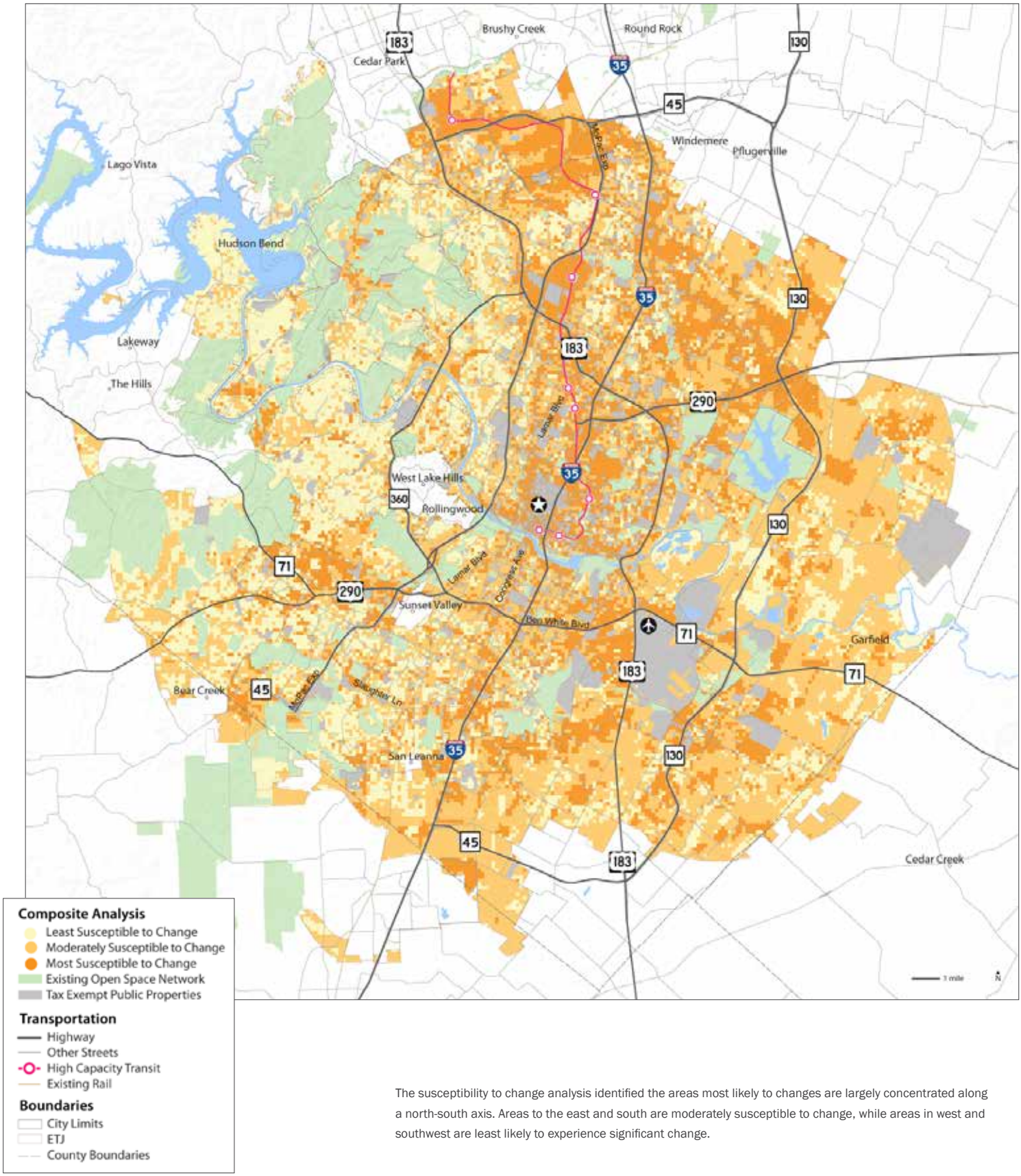
E-3: Emerging Projects as of February 2017- City of Austin*	
Name	**Description**
Windrift Way Condominiums	This 4-acre lot will have 32 single family condominium.
Xbiotech Research Facilities	The 48 acre site of a bio-medical research and development project will consist of six buildings in a campus type setting. The first phase will consist of a 51,900 sq.ft office warehouse building.
Zachary Scott II (Smart Housing)	This 270 acre site will have 651 single family homes.

Source: City of Austin Emerging Projects, 2017.

Attachment F

Transportation, Land Use, and Other Planning Maps from Various Jurisdiction

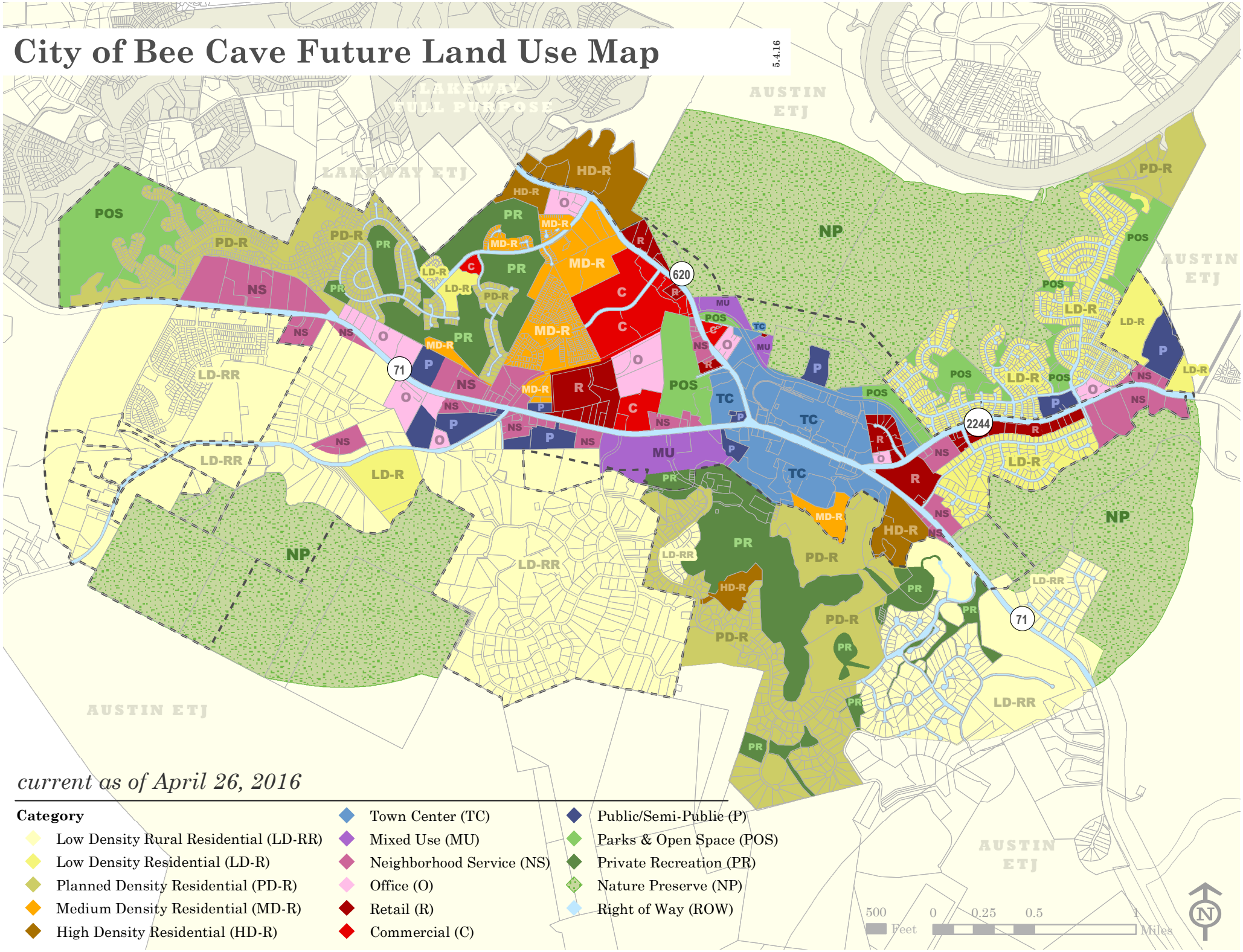
Figure 2.5 **Susceptibility to Change Analysis**



The susceptibility to change analysis identified the areas most likely to changes are largely concentrated along a north-south axis. Areas to the east and south are moderately susceptible to change, while areas in west and southwest are least likely to experience significant change.

City of Bee Cave Future Land Use Map

5.4.16



current as of April 26, 2016

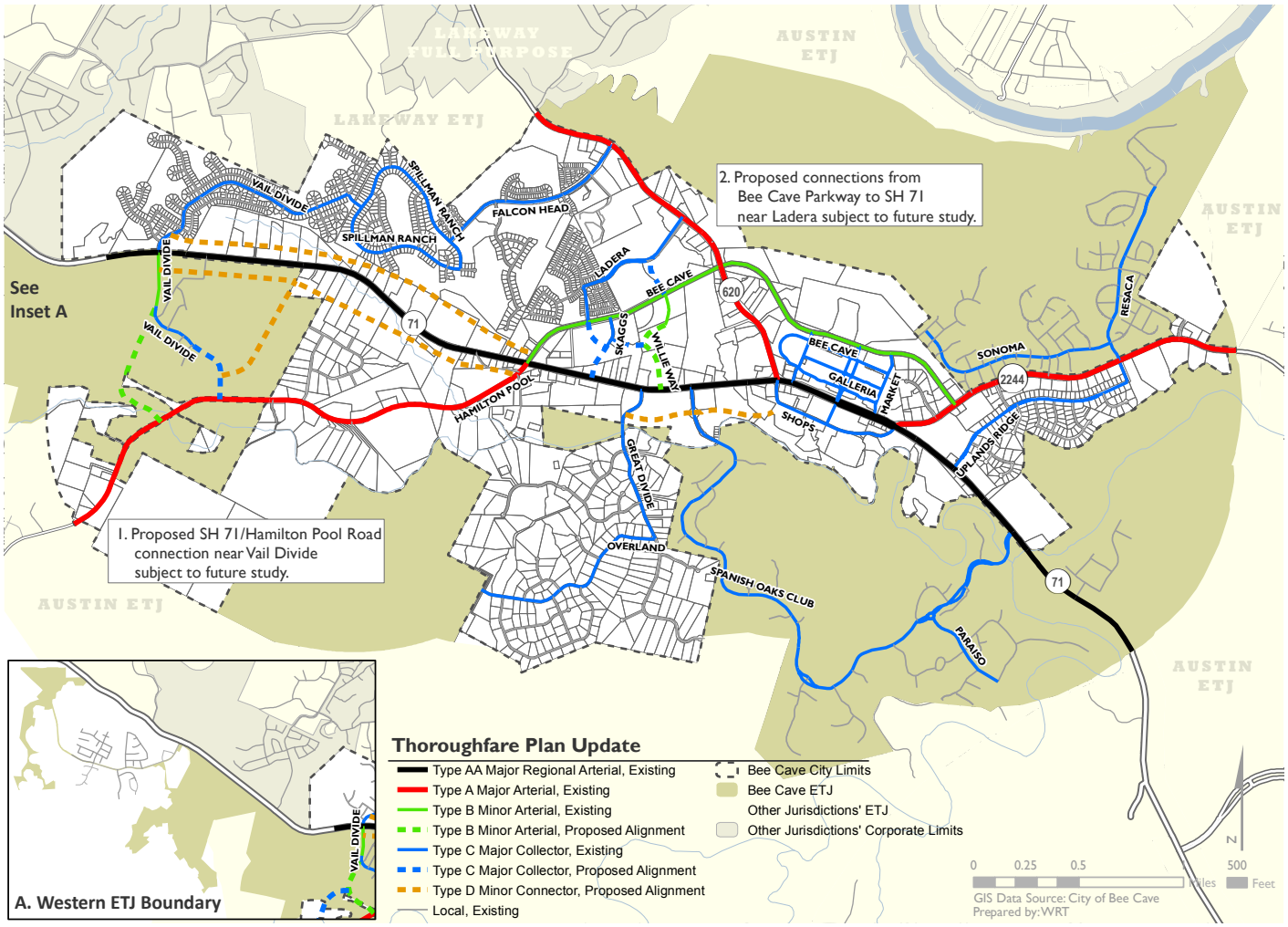
Category

- Low Density Rural Residential (LD-RR)
- Low Density Residential (LD-R)
- Planned Density Residential (PD-R)
- Medium Density Residential (MD-R)
- High Density Residential (HD-R)
- Town Center (TC)
- Mixed Use (MU)
- Neighborhood Service (NS)
- Office (O)
- Retail (R)
- Commercial (C)
- Public/Semi-Public (P)
- Parks & Open Space (POS)
- Private Recreation (PR)
- Nature Preserve (NP)
- Right of Way (ROW)

500 0 0.25 0.5 1
Feet Miles

N

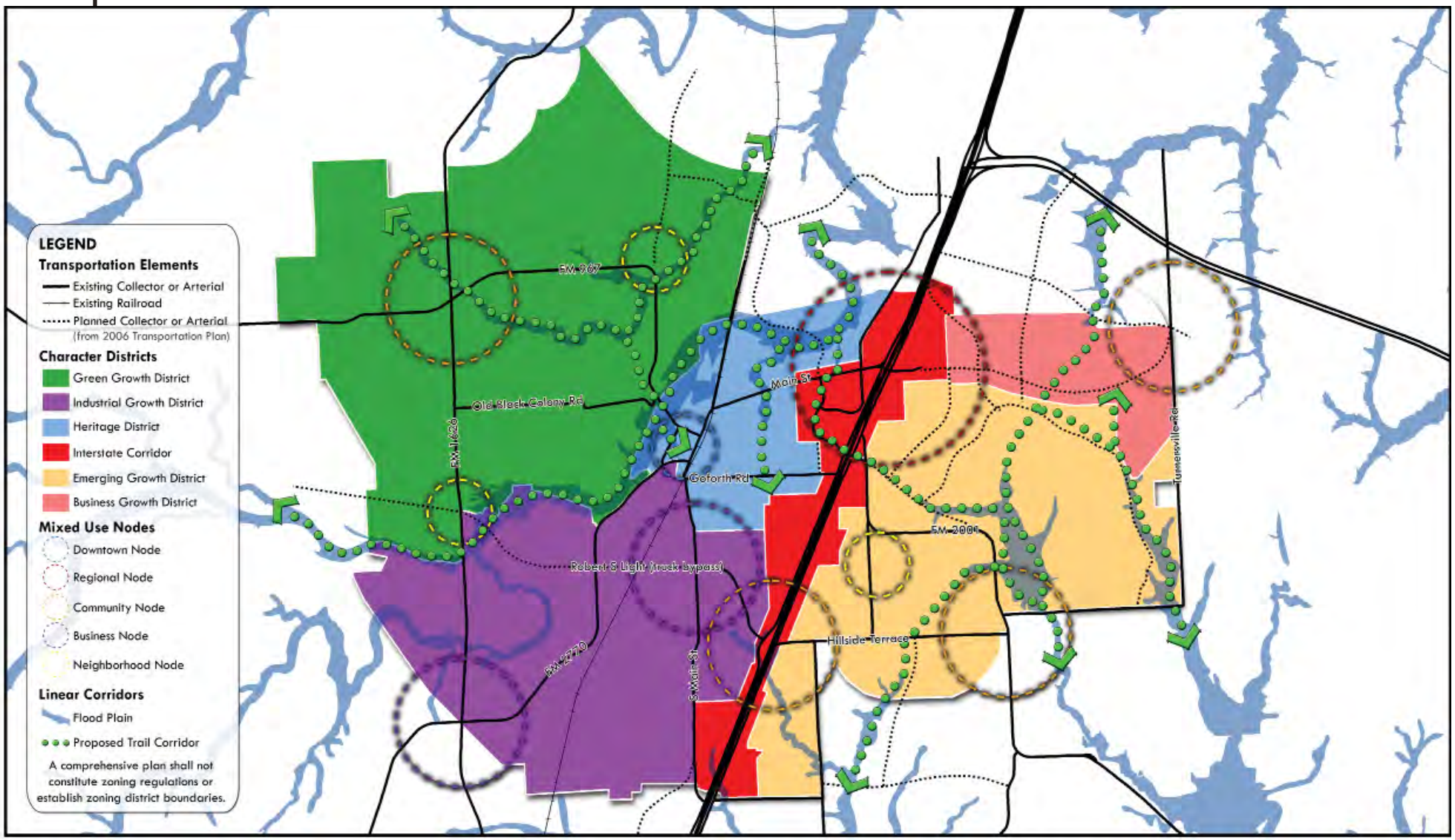
Figure 3-2 Thoroughfare Plan



of-way or a public access easement, which provides connectivity between developments in order for short trips to bypass using the arterial and collector network. These connectors will provide Bee Cave residents, businesses, and visitors another option when making local trips, intentionally reducing the need to get on SH 71. Type D's are displayed on the Thoroughfare Plan Map to represent areas where additional connections are needed.

The implementation of Type D's will require focus at the time these properties are developed to determine the preferred alignment and facility type. This will include consideration of the following:

- Location of connections to collectors and arterials;
- Intersection design options;
- Flexibility relative to location of the alignment; and
- Whether the roadway is a public facility or an access easement.



Buda Future Land Development Plan

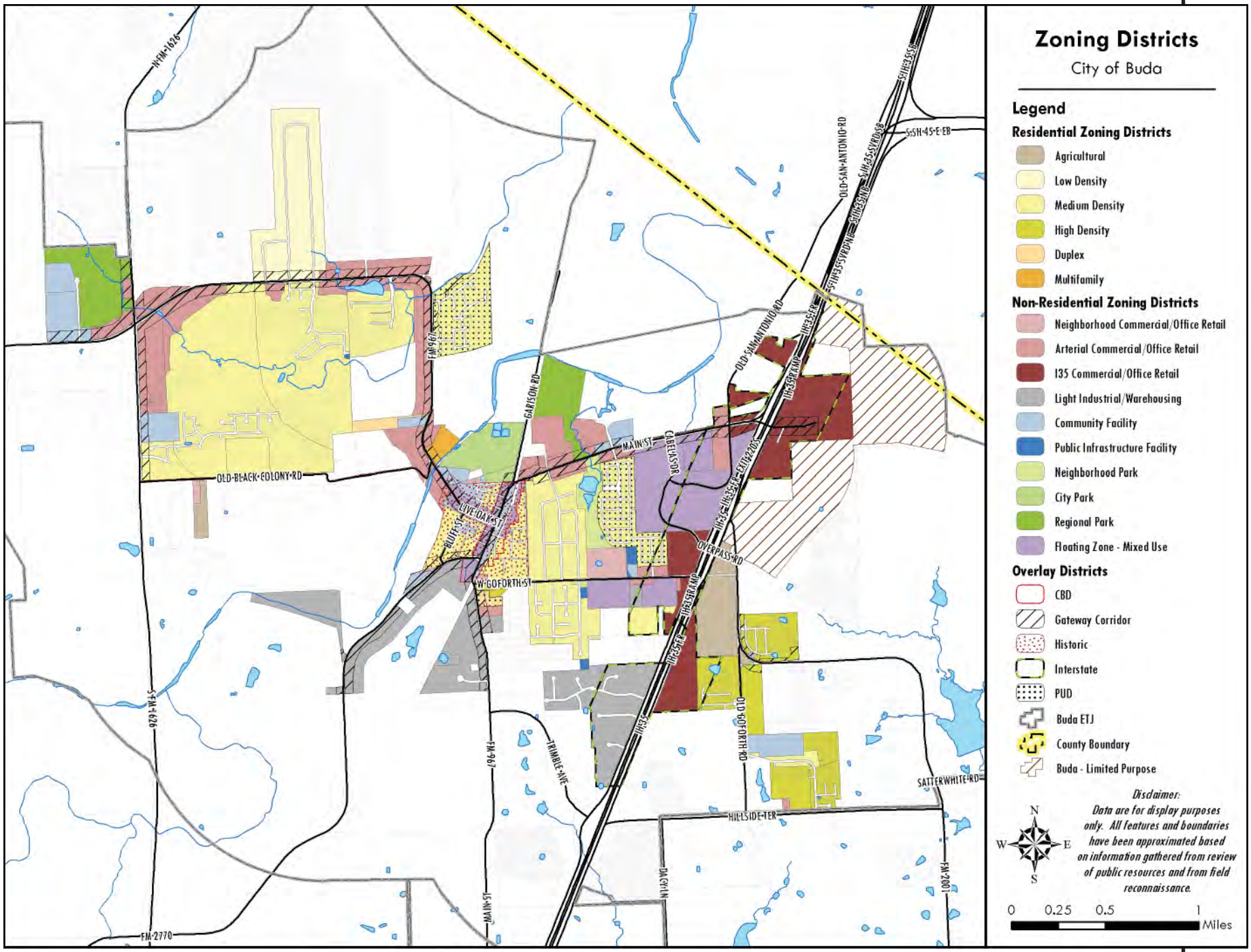
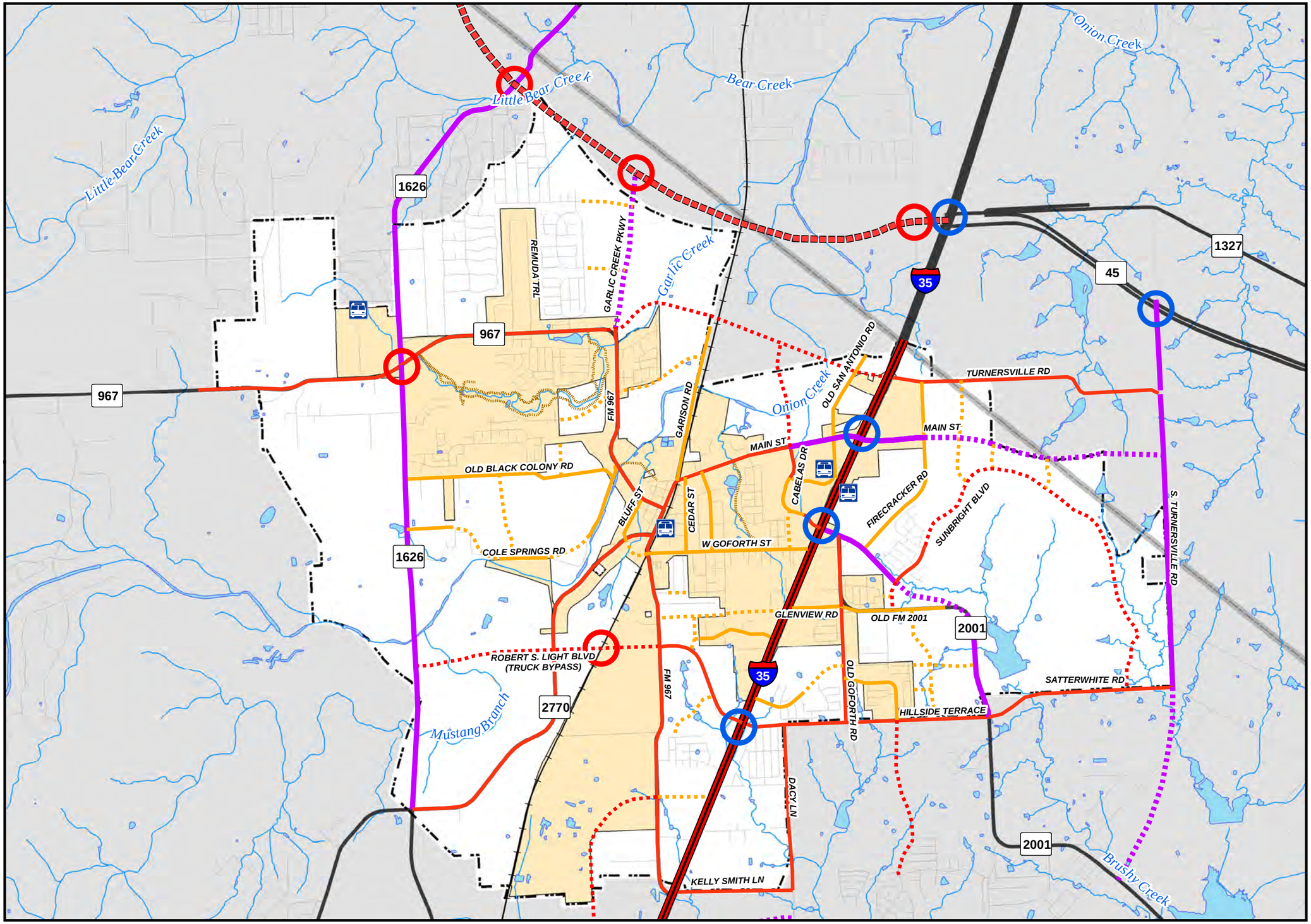

Zoning Districts
City of Buda
Legend
Residential Zoning Districts
Agricultural
Low Density
Medium Density
High Density
Duplex
Multifamily
Non-Residential Zoning Districts
Neighborhood Commercial/Office Retail
Arterial Commercial/Office Retail
I35 Commercial/Office Retail
Light Industrial/Warehousing
Community Facility
Public Infrastructure Facility
Neighborhood Park
City Park
Regional Park
Floating Zone - Mixed Use
Overlay Districts
CBD
Gateway Corridor
Historic
Interstate
PUD
Buda ETJ
County Boundary
Buda - Limited Purpose
Disclaimer:
Data are for display purposes only. All features and boundaries have been approximated based on information gathered from review of public resources and from field reconnaissance.
N
W
E
S
0
0.25
0.5
1
Miles
N-FM-1626
FM-967
OLD-BLACK-COLONY-RD
GARRISON-RD
MAIN-ST
CABEZAS-DR
LIVE-OAK-ST
BLUFF-ST
W-GOFORTH-ST
OLD-SAN-ANTONIO-RD
IH-35-SVRD-NB
IH-35-SVRD-SB
S-SH-45-E-EB
IH-35-EXIT-220B
OVERPASS-RD
IH-35-RAMP
IH-35-NB
IH-35-SB
OLD-GOFORTH-RD
SATTERWHITE-RD
HILLSIDE-TER
TRIMBLE-AVE
DACHAN
FM-2001
S-FM-967
FM-2770

EXHIBIT 3 - Transportation Master Plan



Grade Separations

- Exist. Overpass
- New Overpass

Roadway Network Classification

	ROW*
New Highway	
Highway	
New Parkway	120'
Parkway	120'
New Arterial	(70'-110')
Arterial	(70'-110')
New Collector	(60'-90')
Collector	(60'-90')

*ROW varies based on typical section. Please refer to the Major Roadway Planning Guide for ROW widths of individual segments.

- 8' Off-Street Trail*

On-street Pedestrian and Bicycle Facilites shown in Exhibits 2a & 2b.

- Potential Park and Ride

Legend

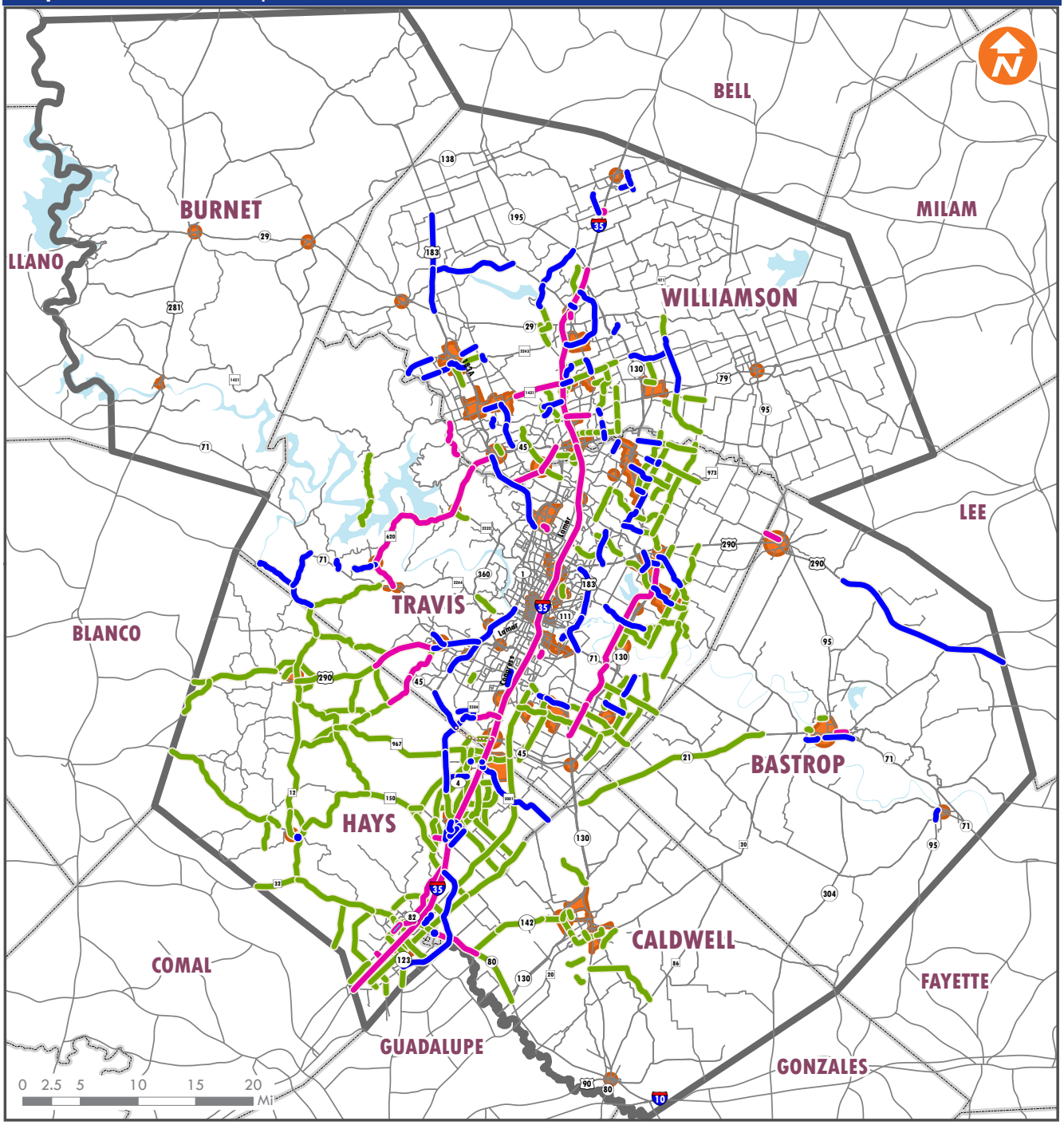
- Railroad
- River/Creek
- Lake/Pond/Reservoir
- County Boundary
- Buda City Limit
- Buda ETJ

N

CITY OF BUDA

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

Map 14: 2040 Road Projects with Centers



This map was developed by CAMPO for the purpose of aiding in regional transportation planning decisions and is not warranted for any other use. CAMPO makes no guarantee regarding its accuracy or completeness. If you would like to receive the GIS layers found on this map send your request to: campo@campotexas.org.
Data Source: CAMPO

Author: GSG
Document Path: H:\Maps\2040 Plan Maps\Revised Plan Maps\CAMPO 2040 Plan Road Projects with Centers.mxd

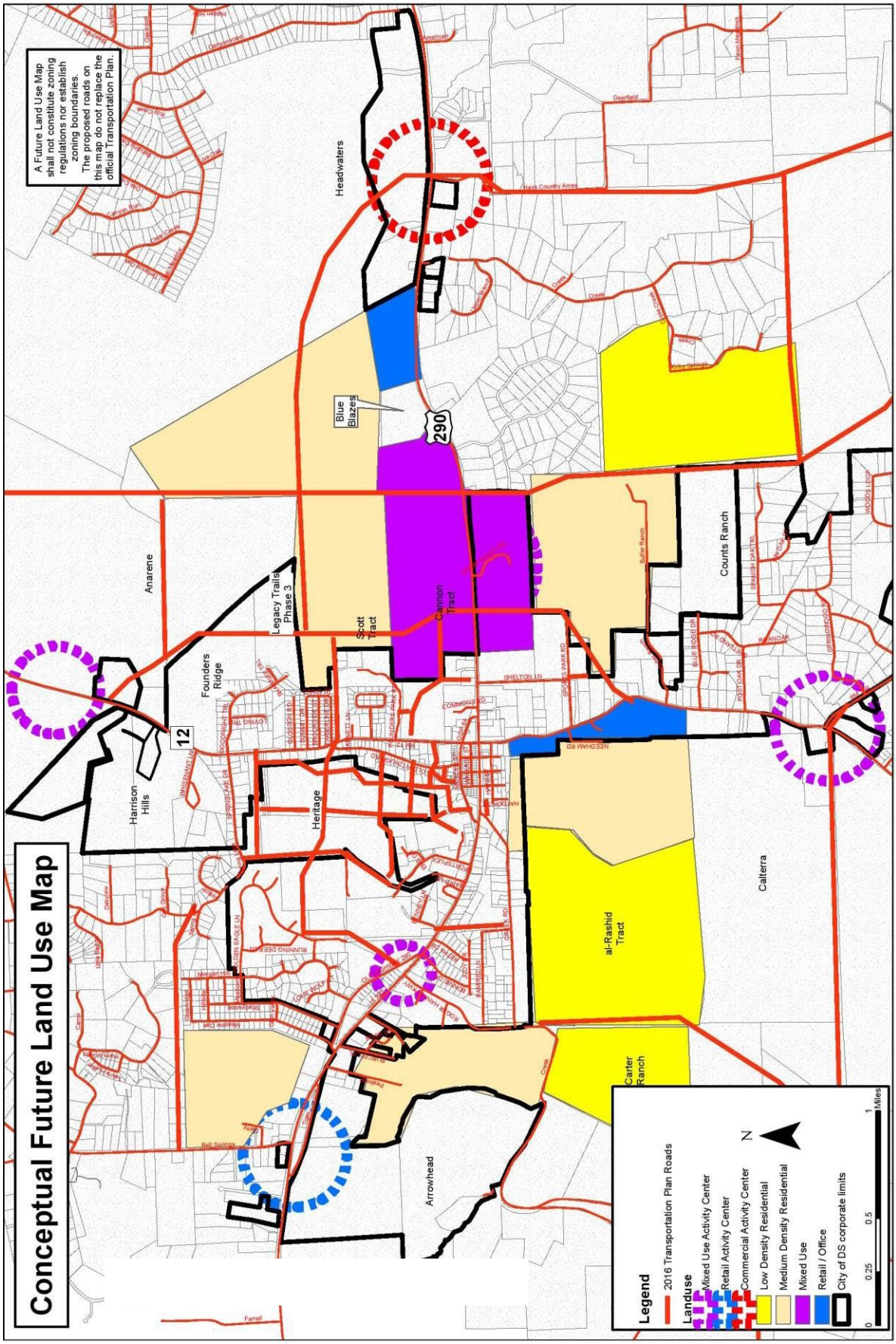


Figure 1: Conceptual Future Land Use Map

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N
W E
S

Active & Potential Development

City of DS corporate limits

Type_Annex
- Full Purpose
- Limited Purpose

Potential Subdivisions

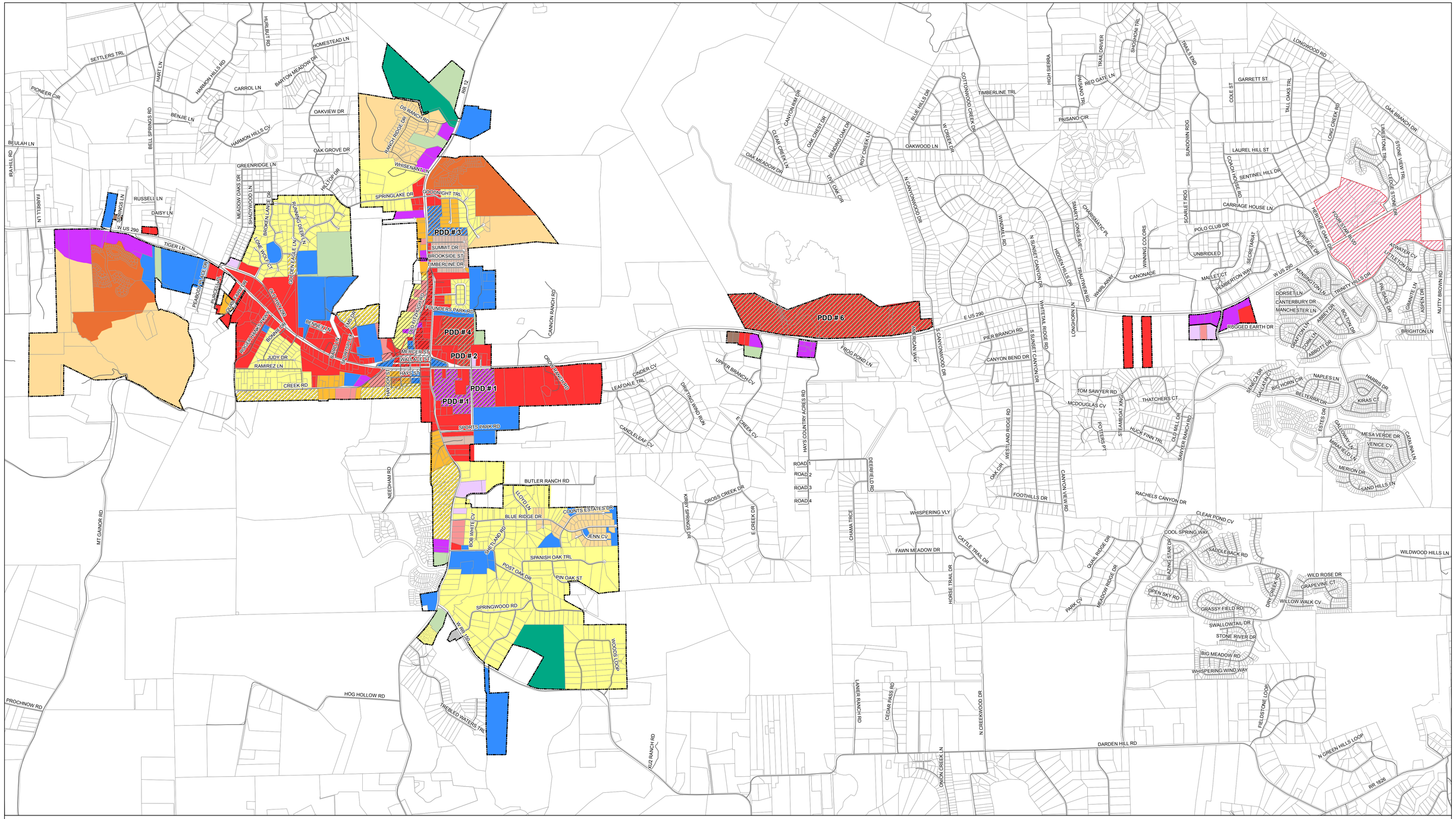
Status
- Approved - Concept Plan
- Approved - Development Agreement
- Approved - condo plat
- Future Potential
- Under Consideration - Development Agreement
- Under Consideration - Final Plat and Constr Plans
- Under Consideration - Revised Dev Agreement
- Under Construction - Homes
- Under Construction - Infrastructure

Bella Vista
Bonham Tract
Anarene
Anarene
Anarene
Anarene
Anarene
Needham tract
Scenic Greens
Harrison Hills
Founders Ridge
Merritt Hill Country Senior Apts
Legacy Trails, Phase 3
HC Carter 17 acres
Heritage tract (fka Baird)
Heritage tract (fka Davidson)
Scott tract
Twenty Six Doors
Arrowhead
Burrows
Meritage
Cannon tract
Blue Blazes
Headwaters @ Barton Creek
Saratoga Hills
Ledgestone
Ledgestone Senior Apts
Belterra Springs Apts
Belterra
al-Rashid tract (fka Slaughter tract)
Carter Ranch
Counts Ranch
Caliterra
Gardens of Howard Ranch
Howard Ranch
Garnett Ranch
Highpointe
Parten Tract
Reunion Ranch
Driftwood
Rim Rock
Rutherford Ranch

12
290
290
150
12
1826
967

0 0.5 1 2 3 4 5 Miles

Name	Acres	Lots	Status
al-Rashid tract (fka Slaughter tract)	454.64161221818 7	TBD	Future Potential
Anarene	224.96437791283	Development Agreement (1600 homes)	Approved - Development Agreement
Anarene	1279.15701020129	Development Agreement	Approved - Development Agreement
Anarene	136.75855420335	Development Agreement	Approved - Development Agreement
Anarene	34.088205413173 7	Development Agreement	Approved - Development Agreement
Anarene	17.641409762760 1	Development Agreement	Approved - Development Agreement
Arrowhead	363.93777587783 9	375 homes	Under Construction - Homes
Bella Vista	155.69567771803 31	89 homes	Approved - Development Agreement
Belterra	1536.52942677379	2000 permitted (500 left to build approx.)	Under Construction - Homes
Belterra Springs Apts	9.5382968668036 1	150 units	Under Construction - Homes
Blue Blazes	34.503327799558 7	30 homes - mixed use w / commercial	Approved - Development Agreement
Bonham Tract	308.28451949667 5	TBD	Future Potential
Burrow s	15.845589264816 5	76 homes	Under Construction - Infrastructure
Caliterra	563.38058860449 7	600	Under Construction - Homes
Cannon tract	296.25804650051 3	TBD	Future Potential
Carter Ranch	201.69541089994 6	TBD	Future Potential
Counts Ranch	152.20598461016 8	100 homes approx.	Under Construction - Homes
Driftw ood	453.345767323862	150 homes	Under Construction - Infrastructure
Founders Ridge	107.037580850213	204	Under Construction - Infrastructure
Gardens of How ard Ranch	8.5485146981593 1	35	Approved - condo plat
Garnett Ranch	150.70165862845 6	89 previously approved by preliminary plat	Future Potential
Harrison Hills	156.79251879927 5	100 homes approximately	Under Construction - Homes
HC Carter 17 acres	17.070792775987 6	TBD	Future Potential
Headw aters @ Barton Creek	1503.77826181254	1000 homes	Under Construction - Infrastructure
Heritage tract (fka Baird)	83.429618566172 2	In design (anticipated 600-800 homes)	Under Consideration - Development Agreement
Heritage tract (fka Davidson)	102.437441215531	In design	Under Consideration - Development Agreement
Highpointe	740.15659889380 6	1029 (several phases already built)	Under Construction - Homes
How ard Ranch	229.13631250596 8	150	Under Construction - Homes
Ledgestone	197.88143468441 6	242	Under Construction - Homes
Ledgestone Senior Apts	15.624499360190 1	160 units (Combination: Assisted / Independent)	Under Construction - Infrastructure
Legacy Trails, Phase 3	58.821380356568 6	54 homes	Under Construction - Infrastructure
Meritage	28.048263170715 7	PDD # 4 (130 homes)	Under Consideration - Final Plat and Constr Plans
Merritt Hill Country Senior Apts	6.8391272790444	In progress (80 apts)	Approved - Concept Plan
Needham tract	107.478220741139	TBD	Future Potential
Parten Tract	508.63679804328 5	500+ homes	Under Consideration - Development Agreement
Reunion Ranch	526.96479815694 2	524 homes	Under Construction - Homes
Rim Rock	1229.353885581 99	675	Under Construction - Homes
Rutherford Ranch	858.75727192759 9	291	Under Construction - Homes
Saratoga Hills	347.97511572754 7	156 homes	Under Construction - Homes
Scenic Greens	728.40385973928 1	918 per development agreement	Under Consideration - Revised Dev Agreement
Scott tract	200.75554800651 6	TBD	Future Potential
Tw enty Six Doors	6.5745923477327 8	27 homes (13 duplexes, 1 SFR)	Approved - condo plat



Legend

- City Limits
- Limited Purpose
- Historic Overlay
- PDD Overlay
- AG
- PP
- SF-1
- SF-2
- SF-3
- SF-4
- SF-5
- MF
- MH
- O
- LR
- GR
- GUI
- CS
- LI
- Industrial

0 0.5 1 2 3 Miles

City of Dripping Springs, Texas
Official Zoning Map

Map Updated January 2017

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N

W E

S

12

290

Bell Springs Road

Springlake Drive

Old 290

Roger Hanks Pkwy

Old Fitzhugh Road

Rob Shelton Blvd

290

Creek Road

Butler Ranch Rd

Blue Ridge Dr

Springwood Rd

150

12

This product is for informational purposes only and may not have been prepared for or be suitable for legal, engineering, or suveying purposes. It does not represent an on-ground survey and represents only the approximate relative location of property boundaries.

City of Dripping Springs
Official Transportation Map
Approved by City Council
March 4, 2014 (Resolution # 2014-14)

- Existing Streets
- Corporate Limits
- Proposed Routes

HAYS COUNTY TRANSPORTATION PLAN

MAJOR THOROUGHFARE PLAN

ADOPTED: JANUARY 22, 2013
AMENDED: MARCH 5, 2013
AMENDED: JUNE 25, 2013
AMENDED: APRIL 15, 2014
AMENDED: JULY 22, 2014
AMENDED: AUGUST 2, 2016

Legend

- Add Lanes
- Enhance to MAU 2
- New Facilities
- Interstate Highway 35

0 1 2 4 Miles

Disclaimer

The roads shown on this map represent general routes. Precise alignments will be established by the Hays County Engineer and the Development Services Department Director in accordance with the subdivision and development process.

THIS MAP IS NOT OF SURVEY QUALITY.
NO GUARANTEE IS EXPRESSED
OR IMPLIED REGARDING ACCURACY
OR COMPLETENESS.

SOURCE: CAPCOG; HAYS COUNTY DEVELOPMENT SERVICES; PARSONS BRINKERHOFF

The Districts of the Future Land Use Plan

Each district of the Future Land Use Plan was created to manifest land use in a consistent, yet unique manner, fostering a clearly recognizable sense of place. This sense of place in turn reinforces the meaning, and therefore community, established within the various areas of the City of Kyle.

The land use districts of the Future Land Use Plan are grouped into three general categories. These categories articulate the primary determinant of the nature of each district. This determinant guides and directs decisions made regarding form, function, boundaries, density, and acceptable uses within the given district. The districts of the Future Land Use Plan are categorized as:

- Landscapes preserve and promote environment
- Communities preserve and promote neighborhoods
- Nodes preserve and promote commercial development

Future Land Use Plan Map Graphic

Figure 2 displays the 15 land use districts designed for Kyle, as well as the two corridor conditions. Each one of the Landscapes, Communities, and Nodes will be described in greater detail on the following pages. The Corridor Conditions are conceptually illustrated on the Land Use Plan graphic in Figure 2 as a series of hatched areas, marking land that directly interfaces with key roadways, including existing roadways and those identified by the Thoroughfare Plan element of this Comprehensive Plan document.

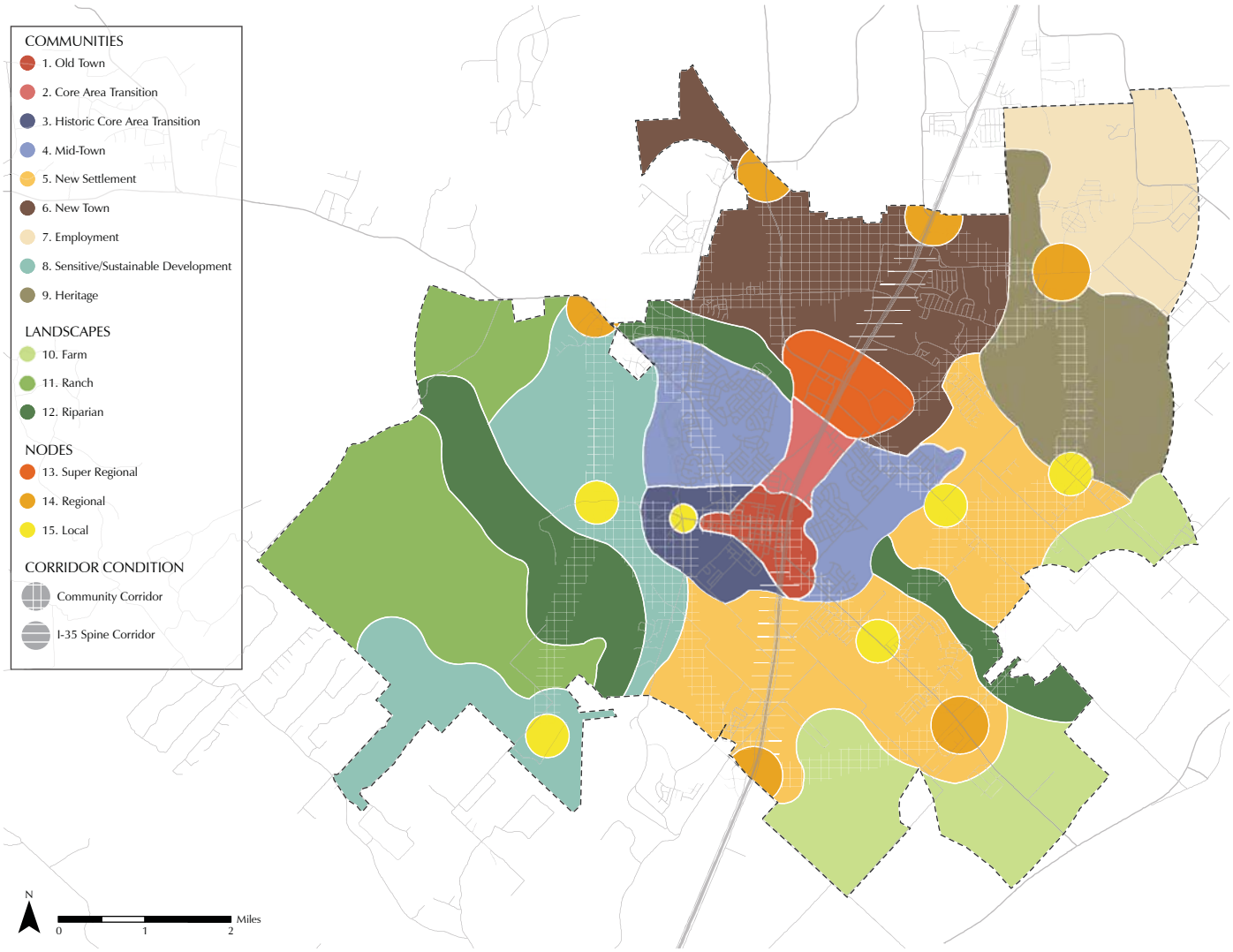


Figure 2: Kyle Future Land Use Plan.

Zoning Categories

- R-1: Single Family
- R-1-1: Single Family Residential 1
- R-1-2: Single Family Residential 2
- R-1-A: Single Family Attached
- R-1-T: Residential Townhome
- R-2: Residential Two Family
- R-3-1: Multi-Family Residential 1
- R-3-2: Multi-Family Residential 2
- R-3-3: Apartments Residential 3
- M-2: Manufactured Home Subdivision
- M-3: Manufactured Home Park
- A: Agriculture
- PUD: Planned Unit Development
- CBD-1: Central Business District 1
- CBD-2: Central Business District 2
- R/S: Retail/Service
- CC: Community Commercial
- C-1: Commercial
- C-2: Commercial - General Business
- C/M: Construction/Manufacturing
- E: Entertainment
- HI: Heavy Industrial
- HS: Hospital Services
- T/U: Transportation/Utilities
- W: Warehouse

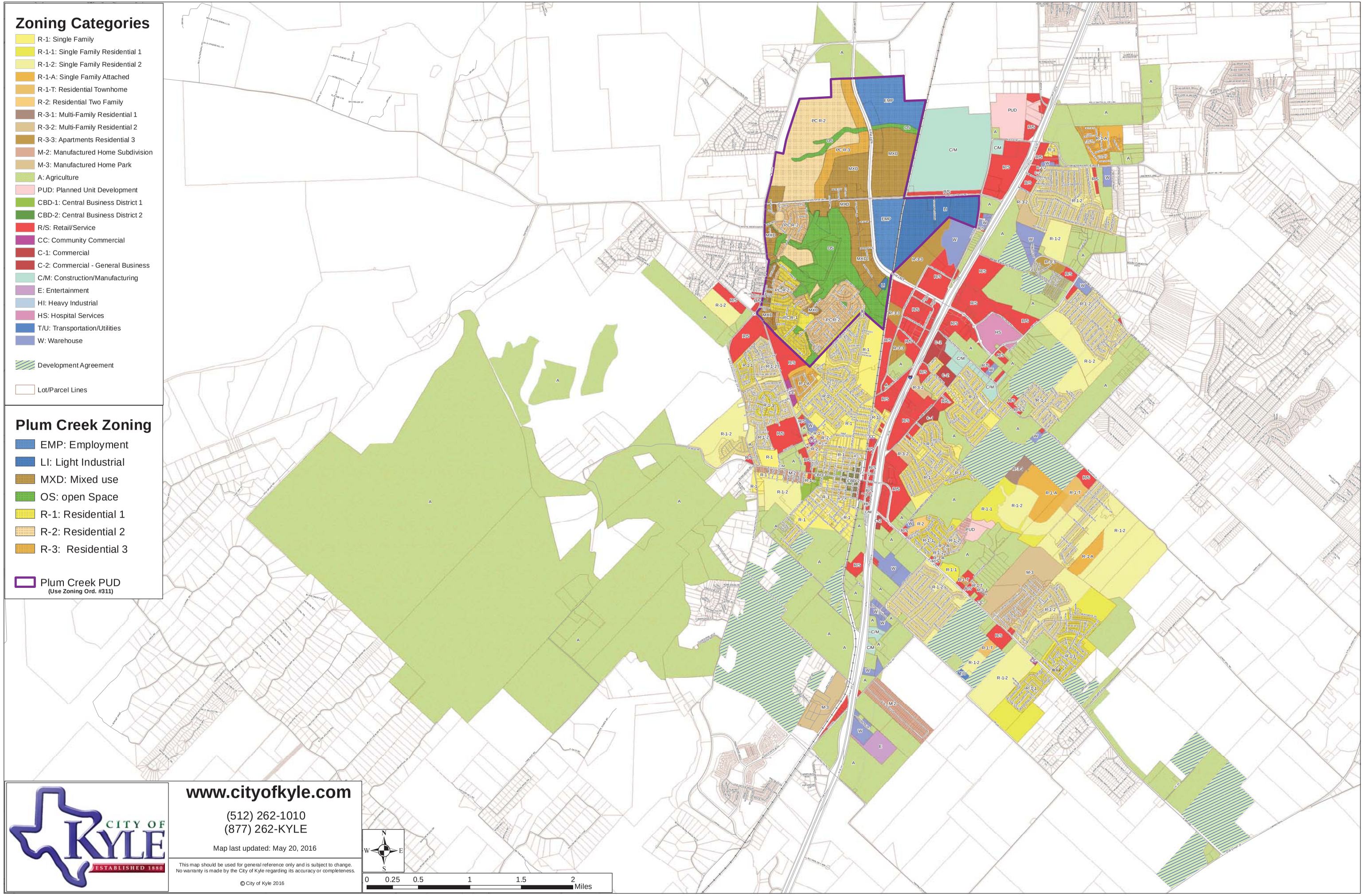
Development Agreement

Lot/Parcel Lines

Plum Creek Zoning

- EMP: Employment
- LI: Light Industrial
- MXD: Mixed use
- OS: open Space
- R-1: Residential 1
- R-2: Residential 2
- R-3: Residential 3

Plum Creek PUD
(Use Zoning Ord. #311)



www.cityofkyle.com

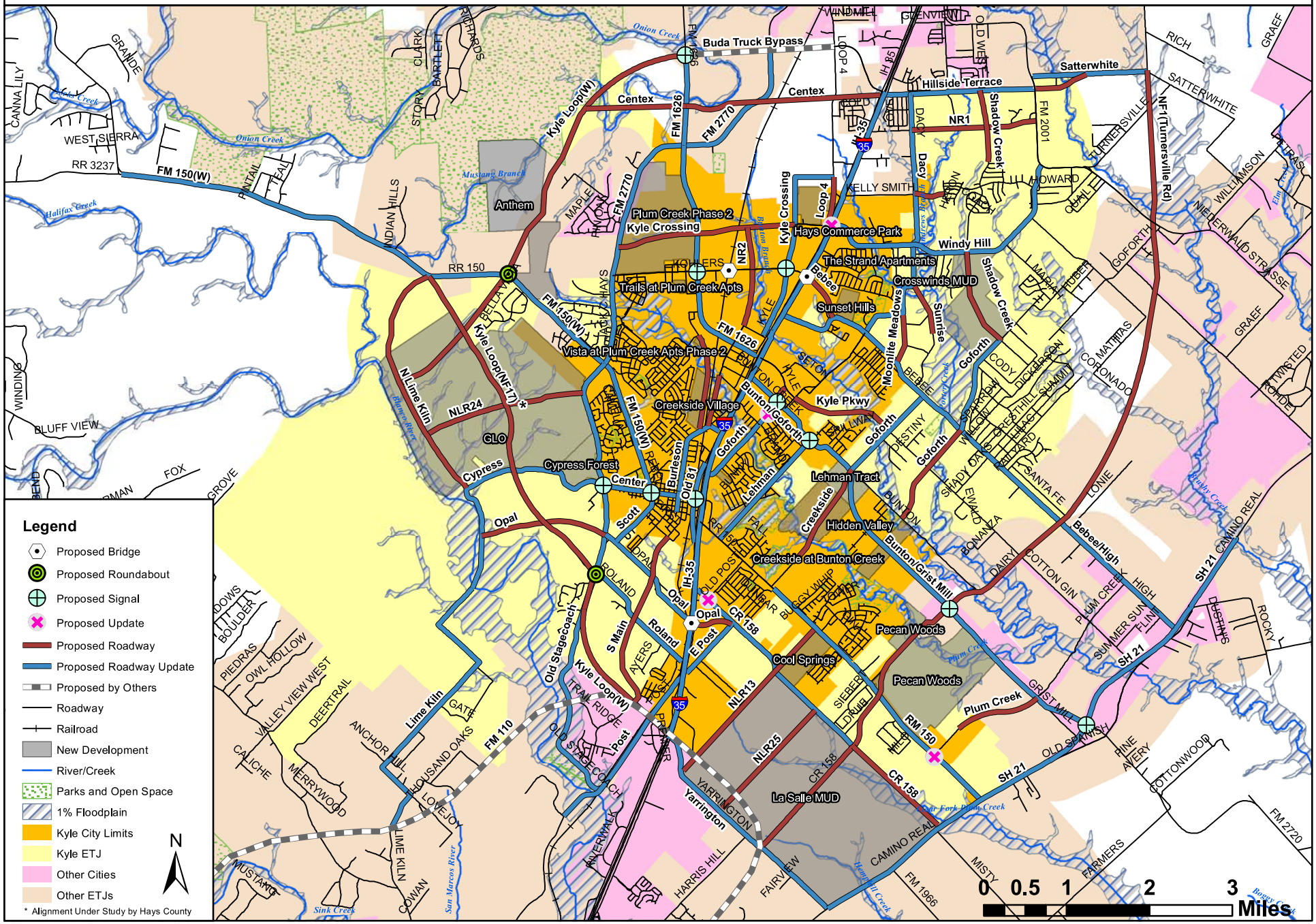
(512) 262-1010
(877) 262-KYLE

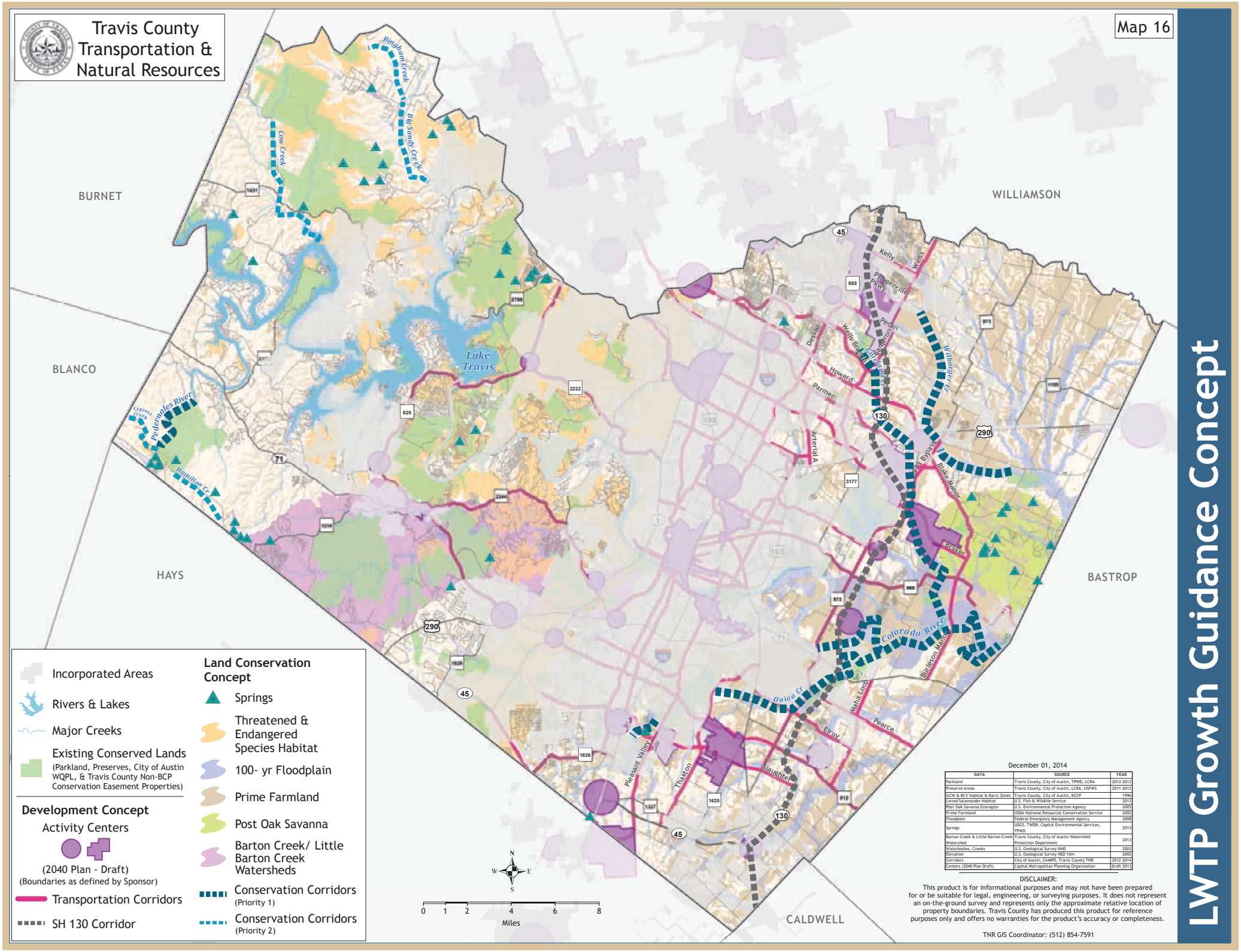
Map last updated: May 20, 2016

N W E S

0 0.25 0.5 1 1.5 2 Miles

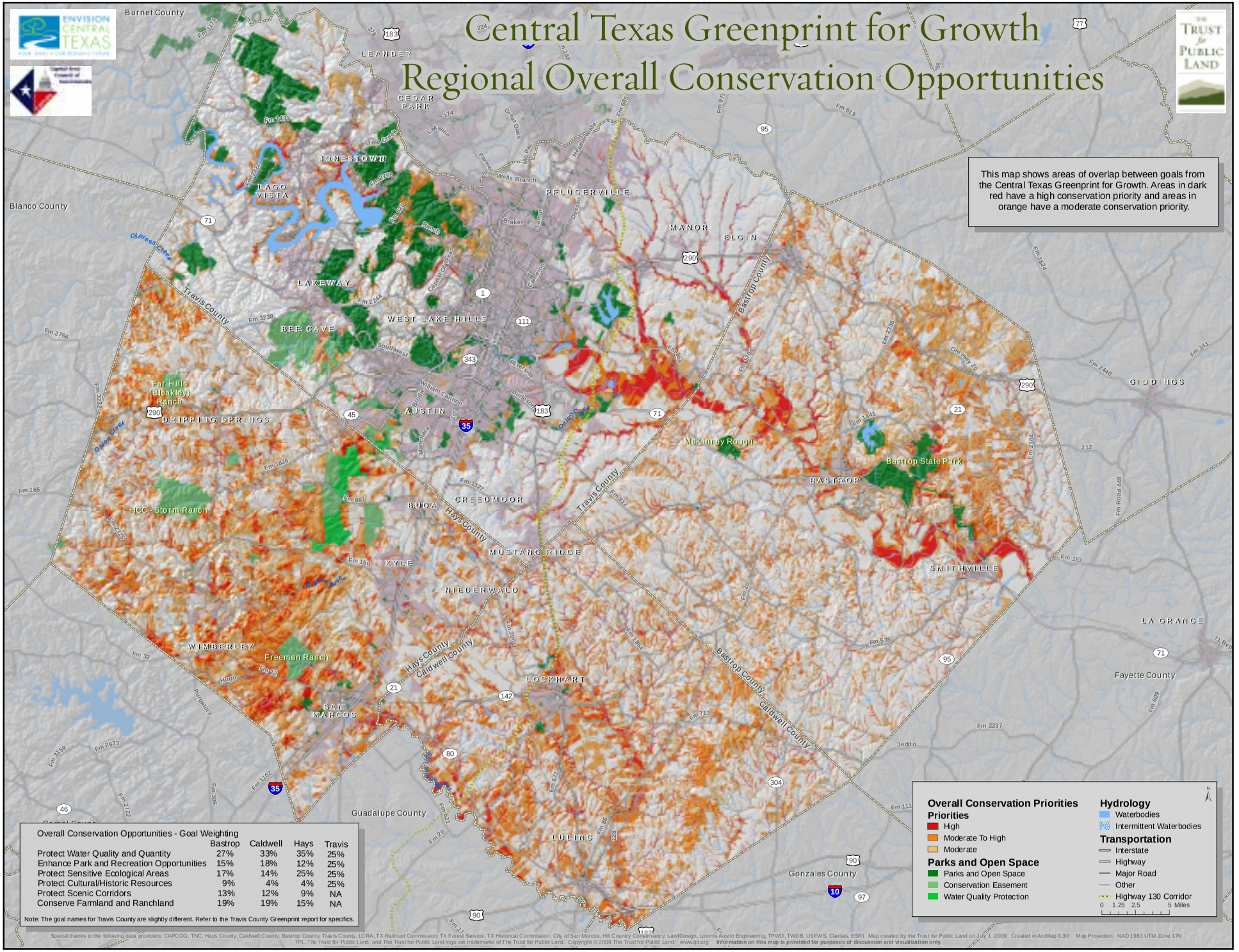
Kyle Transportation Master Plan - 2045 Proposed Projects





DATA	SOURCE	YEAR
Parkland	Travis County, City of Austin, TPWD, LCRA	2012-2013
Preserve Areas	Travis County, City of Austin, LCRA, USFWS	2011-2012
GCW & BCV Habitat & Karst Zones	Travis County, City of Austin, BCCP	1996
Listed Salamander Habitat	U.S. Fish & Wildlife Service	2013
Post Oak Savanna Ecoregion	U.S. Environmental Protection Agency	2005
Prime Farmland	USDA National Resources Conservation Service	2002
Floodplain	Federal Emergency Management Agency	2008
Springs	USGS, TWDB, Capitol Environmental Services, TPWD	2013
Barton Creek & Little Barton Creek Watershed	Travis County, City of Austin Watershed Protection Department	2013
Waterbodies, Creeks	U.S. Geological Survey NHD	2003
Elevation	U.S. Geological Survey NED 10m	2002
Corridors	City of Austin, CAMPO, Travis County TNR	2012-2014
Centers (2040 Plan Draft)	Capital Metropolitan Planning Organization	Draft 2013

Central Texas Greenprint for Growth
Regional Overall Conservation Opportunities



Overall Conservation Opportunities - Goal Weighting	Bastrop	Caldwell	Hays	Travis
Protect Water Quality and Quantity	27%	33%	35%	25%
Enhance Park and Recreation Opportunities	15%	18%	12%	25%
Protect Sensitive Ecological Areas	17%	14%	25%	25%
Protect Cultural/Historic Resources	9%	4%	4%	25%
Protect Scenic Corridors	13%	12%	9%	NA
Conserve Farmland and Ranchland	19%	19%	15%	NA

Note: The goal names for Travis County are slightly different. Refer to the Travis County Greenprint report for specifics.

Special thanks to the following data providers: CAPCOG, TNC, Hays County, Caldwell County, Bastrop County, Travis County, LCRA, TX Railroad Commission, TX Forest Service, TX Historical Commission, City of San Marcos, Hill Country Conservancy, LandDesign, Looms Austin Engineering, TPWD, TWDB, USFWS, Claritas, ESRI Map created by the Trust for Public Land on July 1, 2009 Created in ArcMap 9.3® Map Projection: NAD 1983 UTM Zone 17N